EACS

European AIDS Clinical Society

Guidelines

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The European AIDS Clinical Society (EACS) is a not-for-profit group of European physicians, clinicians and researchers in the field of HIV/AIDS. It aims to bring together scientists from all over Europe to help exchange the latest medical and scientific knowledge regarding clinical aspects of HIV/AIDS and its complications.

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- ✓ Antimalarial drugs & cART
- ✓ Drug dependency and drug addiction
- ✓ Management of hyperlactataemia and management of lactic acidosis
- ✓ IADL (Instrumental Activities of Daily Living) scale
- ✓ References
- ✓ Conflicts of interest

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Abbreviations used throughout this document

ARV ABBREVIATIONS

- ABC=abacavir
- ATV=atazanavir
- d4T=stavudine
- ddI=didanosine
- DRV=darunavir
- EFV=efavirenz
- ENF=enfuvirtide
- ETV=etravirine
- FDC=fixed dose combination
- FPV=fosamprenavir
- FTC=emtricitabine
- IDV=indinavir
- 3TC=lamivudine
- LPV=lopinavir
- MVC=maraviroc
- NFV=nelfinavir
- NRTI=nucleos(t)ide reverse transcriptase inhibitors
- NNRTI=non-nucleoside reverse transcriptase inhibitors
- NVP=nevirapine
- PI=protease inhibitors
- PI/r=protease inhibitors pharmacologically boosted with ritonavir
- RAL=raltegravir
- RTV=ritonavir (used as booster= /r)
- SQV=saquinavir
- TDF=tenofovir
- TPV=tipranavir
- ZDV=zidovudine

OTHER ABBREVIATIONS

- ACE=angiotensin converting enzyme
- ALP=alkaline phosphatase
- ALT=alanine aminotransferase
- aMDRD=abbreviated modification of diet in renal disease formula
- ART=antiretroviral therapy
- AST=aspartate aminotransferase
- BMD=bone mineral density
- BMI=body mass index
- CKD=chronic kidney disease
- CMV=cytomegalovirus
- CNS=central nervous system
- COPD=chronic obstructive pulmonary disease
- CSF=cerebrospinal fluid
- CVD=cardiovascular disease
- CXR=chest X-ray
- DXA=dual energy X-ray absorptiometry
- ECG=electrocardiogram
- eGFR=estimated glomerular filtration rate
- FBC=full blood count
- FRAX=fracture risk assessment tool
- HBV=hepatitis B virus
- HCV=hepatitis C virus
- HDL-c=HDL-cholesterol
- HIVAN=HIV-associated nephropathy
- HPV=human papillomavirus
- HSR=hypersensivity reaction
- IGRA=interferon-gamma release assay
- IHD=ischaemic heart disease
- IV=intravenous
- LDL-c=LDL-cholesterol
- LGV=lymphogranuloma venereum
- Mg=magnesium
- MSM=men who have sex with men
- PPD=purified protein derivative
- PSA=prostate specific antigen
- PTH=parathyroid hormone
- RBV=ribavirin
- STI=sexually transmitted infection
- TC=total cholesterol
- TG=triglycerides
- TDM=therapeutic drug monitoring
- TG=triglycerides
- UA/C=urine albumin/creatinine ratio
- UP/C=urine protein/creatinine ratio
- VL=viral load
- WB=western blot
- Zn=zinc

Part I Assessment of HIV-infected patients at initial and subsequent visits

	Assessment	At HIV diagnosis	Prior to starting cART	Follow-up frequency	Comment	See page
HISTORY						
Medical	Complete medical history including	+	+		On transfer of care repeat assessment	
	• Family history (e.g. premature CVD, diabetes, hypertension, CKD)	+			Premature CVD: Cardiovascular events in a first degree relative: male < 55, female < 65 years	26
	• Concomitant medications [(i)]	+	+	Every visit		22
	• Past and current co-morbidities	+	+		Consider CXR if prior history of pulmonary disease	
	• Vaccination history	+			Measure antibody titres and offer vaccinations where indicated	44
Psychosocial	• Current lifestyle (alcohol use, smoking, diet, aerobic exercise, drug use)	+	+	6-12 m	Adverse lifestyle habits should be addressed more frequently	Online table: Lifestyle interventions
	• Employment	+	+			
	• Social and welfare	+	+	As indicated	Provide advice and support if needed	
	• Psychological morbidity	+	+	Every visit	Provide counselling if needed	
	• Partner and children	+			Test partner and children if at risk	
Sexual and reproductive health	• Sexual history	+		6-12 m	Address issues concerning sexual dysfunction	46
	• Safer sex	+		As indicated	Risk of sexual transmission should be addressed where indicated	
	• Partner status and disclosure	+		As indicated		
	• Conception issues	+	+	As indicated		
HIV DISEASE						
Virology	• Confirmation of HIV Ab +ve test	+				12-21
	• Plasma HIV RNA	+	+	3-6 m	More frequent monitoring of HIV RNA at start of ART	
	• Genotypic resistance test and sub-type	+	+	At virological failure	Perform genotypic resistance test before starting ART if not previously tested or if at risk of super-infection	
	• R5 tropism (if available)	+/-	+		Screen if considering R5 antagonist in regimen	
Immunology	• CD4 absolute count and % (optional: CD8 and %)	+	+	3-6 m [(ii)]	Consider less frequent monitoring for stable patients on ART with high CD4-counts [(ii)]	12-21
	• HLA B5701(if available)	+	+/-		Screen before starting abacavir containing ART, if not previously tested	

	Assessment	At HIV diagnosis	Prior to starting cART	Follow-up frequency	Comment	See page
COINFECTIONS						
STIs	• Syphilis serology	+		Annual/as indicated	Consider more frequent screening if at risk	
	• STI screen	+		Annual/as indicated	Screen if at risk	
Viral Hepatitis	• Hep A serology	+			Screen at risk, vaccinate if non-immune	44
	• Hep C screen	+		Annual/as indicated	Annual screen if ongoing risk. Measure HCV-RNA if HCV Ab+ve or if acute infection suspected. If HCV-RNA +ve	46
	• Hep B screen	+	+		Vaccinate if non-immune. Annual screen in susceptible patients. If Hep B sAg +ve	52
Tuberculosis	• CXR	+			Consider routine CXR in patients from high prevalence TB populations	
	• PPD if CD4-count > 400	+		Re-screen if exposure		
	• IGRA in selected high risk populations (if available)	+				
Others	• Varicella zoster virus serology	+			Offer vaccination where indicated	44
	• Measles/Rubella serology	+			Offer vaccination where indicated	44
	• Toxoplasma serology	+				
	• CMV serology	+				
	• Leishmania serology	+/-			Screen according to travel history/origin	
	• Tropical parasites: e.g. schistosomiasis, strongyloides serology	+/-			Screen according to travel history/origin	
NON-INFECTIOUS CO-MORBIDITIES						
Haematology	• FBC	+	+	3-12 m		
	• Haemoglobinopathies	+			Screen at risk patients	
	• G6PD	+			Screen at risk patients	
Body composition	• Body-mass index	+	+	Annual		Online table: Lifestyle interventions
Cardiovascular disease	• Risk assessment (Framingham score [iii])	+	+	Annual	Should be performed in all men > 40 and women > 50 years without CVD	26
	• ECG	+	+/-		Consider baseline ECG prior to starting PIs associated with potential conduction problems	

	Assessment	At HIV diagnosis	Prior to starting cART	Follow-up frequency	Comment	See page
Hypertension	• Blood pressure	+	+	Annual		27
Lipids	• TC, HDL-c, LDL-c, TG [(iv)]	+	+	Annual	Repeat in fasting state if used for medical intervention (i.e. ≥ 8h without caloric intake)	31
Glucose	• Plasma glucose	+	+	6-12 m	Consider oral glucose tolerance test/HbA1c if fasting glucose levels of 5.7-6.9 mmol/L (100 125 mg/dL)	29
Liver disease	• Risk assessment [(v)]	+	+	Annual	More frequent monitoring prior to starting and on treatment with hepatotoxic drugs	39
	• ALT/AST, ALP, Bilirubin	+	+	3-12 m		
Renal disease	• Risk assessment [(vi)]	+	+	Annual		37
	• eGFR (aMDRD) [(vii)]	+	+	3-12 m	More frequent monitoring if CKD risk factors present and/or prior to starting and on treatment with nephrotoxic drugs [(ix)]	
	• Urine Dipstick analysis [(viii)]	+	+	Annual	Every 6 months if eGFR < 60 mL/min; if proteinuria ≥ 1+ and/or eGFR < 60 mL/min perform UP/C or UA/C [(viii)]	
Bone disease	• Bone profile: calcium, PO4, ALP	+	+	6-12 m		35
	• Risk assessment [(x)] (FRAX® [(xi)] in patients > 40 years)	+	+	2 yrs	Consider DXA in at risk patients	
Vitamin D	• 25 OH Vitamin D	+		As indicated	Screen at risk patients	36
Neurocognitive impairment	• Screening questions	+	+	2 yrs	Screen all patients without highly confounding conditions. If abnormal or symptomatic, refer to algorithm page for further assessment	48
Depression	• Screening questions	+	+	1-2 yrs	Screen at risk patients	32
Cancer	• Mammography			1-3 yrs	Women 50-70 years	25
	• Cervical PAP			1-3 yrs	Sexually active women	
	• Anoscopy and PAP (MSM)			1-3 yrs	Evidence of benefit uncertain	
	• Ultrasound and alpha fetoprotein			6 m	Persons with cirrhosis	40
	• Others				Controversial	

i Review all concomitant medications which may potentially interact with ART drugs or increase of co-morbidities.

ii If stable on ART with undetectable VL and CD4-count > 350x106/L, consider less frequent CD4-count monitoring every 6-12 months.

iii A risk equation developed from HIV populations is under development (see: **www.cphiv.dk/tools.aspx**). Of note, if individual patients receive medication to control dyslipidaemia, and/or hypertension, interpretation of the estimation should be done with caution.

iv Calculator for LDL-cholesterol in cases where TG is not high can be found at **www.cphiv.dk/tools.aspx**.

v Risk factors for chronic liver disease include: alcohol, viral hepatitis, obesity, diabetes, insulin resistance, hyperlipidaemia, hepatotoxic drugs.

vi Risk factors for chronic kidney disease (CKD): hypertension, diabetes, CVD, family history, black African ethnicity, viral hepatitis, concomitant nephrotoxic drugs.

vii eGFR: use the abbreviated modification of diet in renal disease formula (aMDRD) based on serum creatinine, gender, age and ethnicity (see: **www.cphiv.dk/tools.aspx**).

viii Some experts recommend UA/C or UP/C as a screening test for proteinuria in all patients. UA/C: urinary albumin creatinine ratio (mg/mmol) predominantly detects glomerular disease. Use in patients with diabetes mellitus. UP/C: urinary total protein creatinine ratio (mg/mmol) detects total protein secondary to glomerular and tubular disease.

ix Additional screening is required for patients receiving tenofovir (see **p. 38**).

x Classic risk factors: older age, female gender, hypogonadism, family history of hip fracture, low BMI (≤ 19 kg/m^2), vitamin D deficiency, smoking, physical inactivity, history of low impact fracture, alcohol excess (> 3 units/day), steroid exposure (minimum 5 mg for > 3 months).

xi WHO fracture risk assessment tool (FRAX®): (**www.shef.ac.uk/FRAX**).

Part II ARV treatment of HIV-infected patients

Assessing patients' readiness to start ART [i]

Goal: Facilitate decision making and starting ART for patients who qualify according to international guidelines

Before initiating ART, screen for decision making and adherence barriers:	
Patient-related factors: Depression [ii] A. Harmful alcohol or recreational drug use [iii] B. Cognitive problems [iv] C. Low health literacy	System-related factors: D. Health insurance and drug supply E. Continuity of drug supply F. Social support and disclosure
Recognise, discuss and reduce problems wherever possible!	

Assess patients' readiness and support progress between stages: [v]

"I would like to talk about HIV medication." <wait> *"What do you think about it?"* [vi]

Remember:

- Set the agenda before every interview
- Use open questions whenever possible
- Use the WEMS-technique [vii]

Precontemplation: "I don't need it, I feel good". "I don't want to think about it"

Support: Show respect for patient attitude / Try to understand health and therapy beliefs / Establish trust / Provide individualised short information / Schedule the next appointment

Restage again

Contemplation: "I am weighing things up and feel torn about what to do about it"

Support: Allow ambivalence / Support to weigh pros and cons together with patient / Assess information needs and support information seeking / Schedule the next appointment

NO

Restage again

Preparation: "I want to start, I think the drugs will allow me to live a normal life"

Support: Reinforce decision / Make shared decision on most convenient regimen / Educate: adherence, resistance, side effects / Discuss integration into daily life / Assess self-efficacy

Ask: Do you think you can manage to take cART consistently once you have started?

Use: VAS 0-10 [viii]

0 ..... 5 10

NO

Patients presenting in the clinic may be at different stages of readiness: Precontemplation, contemplation or preparation [Transtheoretic model; Prochaska JO. Am Psychol 47:1102-1114, 1992]. The first step is to assess this stage, and then to support/intervene accordingly. An exception is if a patient presents late or very late, i.e. < 200 or < 50 CD4/µL. In this case the initiation of ART should not be delayed; the clinician should try to identify the most important adherence barriers which may be present, and support the patient to be prepared for prompt initiation of ART.

Consider skills training:

- Medication-taking training, possibly MEMS (2-4wk) [ix]
- Directly Observed Therapy with educational support
- Use aids: Pillboxes, cell phone alarm, involve contact persons where appropriate

START AND MAINTAIN ADHERENCE

Screen: For adherence problems in each meeting [x]

Support: Discuss side effects, educate about surrogate markers, discuss integration of drug-taking schedule

Empower: Give positive feedback

Comments on the table “Assessing patients’ readiness to start ART”

i This table should facilitate the initiation of ART. Matters for consideration listed in this table, such as decision making or barriers to adherence, have to be judged clinically in their context. For instance, the clinician has to judge whether ART has to be initiated immediately despite the detection of possible barriers to adherence or whether delaying initiation is justified. Consider patient’s cultural background.

ii Ask: *“During the past month, have you often been bothered by feeling down, depressed or hopeless?” “During the past month, have you often been bothered by little interest or pleasure in doing things?” “Is this something with which you would like help?”* If answers are positive, then sensitivity is 96 %, specificity 89 % (Arroll B et al. BMJ 327:1144-1146. 2003).

iii Ask: *“Have you thought about cuttting down?”; “Have you ever become annoyed when people talk to you about your drinking?”; “Have you ever felt guilty about your drinking?”; “Do you ever have a drink first thing in the morning (eye opener)?”*. An affirmative answer to more than two CAGE questions means a sensitivity and specificity for problematic alcohol use of more than 90 % (Kitchens JM. JAMA 272(22): 1782-1787. 1994). Ask similar questions for recreational drug use.

iv Ask: *“Do you feel that you are having problems concentrating in your daily life?”; “Do you feel slow in your thinking?”; “Do you feel that you are having problems with your memory?”; “Have relatives or friends expressed that they feel you are having problems with your memory or difficulty concentrating?”*

v Patients presenting in the clinic may be at different stages of readiness: Precontemplation, contemplation or preparation [Transtheoretic model; Prochaska JO. Am Psychol 47:1102-1114, 1992]. The first step is to assess this stage, and then to support/intervene accordingly. An exception is if a patient presents late or very late, i.e. < 200 or < 50 CD4/µL. In this case the initiation of ART should not be delayed; the clinician should try to identify the most important adherence barriers which may be present, and support the patient to be prepared for prompt initiation of ART.

vi This is a suggested opening question to assess the patient’s stage of readiness. Further discussion will indicate which of the three initial stages the patient has reached: he/she might even be ready for therapy.

vii WEMS: Waiting (> 3 sec), Echoing, Mirroring, Summarising (Langewitz W et al. BMJ 325:682-683. 2002).

viii VAS (= Visual Analogue Scale; Range from 0 to 10 i.e. 0 = I will not manage, 10 = I am sure I will manage).

ix Medication training/MEMS training could be done with vitamins before starting ART.

x Suggested adherence questions: *“In the past 4 wks, how often have you missed a dose of your HIV medication: every day, more than once a wk, once a wk, once every 2 wks, once a month, never?” “Have you missed more than one dose in a row?”* (Glass TR et al. Antiviral Therapy 13(1):77-85. 2008).

Adapted from: J. Fehr, D. Nicca, F. Raffi, R. Spirig, W. Langewitz, D. Haerry, M. Battegay, NEAT, 2008.

Recommendations for initiation of ART in HIV-positive persons without prior ART exposure [i]

Recommendations are graded while taking into account both the degree of progression of HIV disease and the presence of or high risk for developing various types of (co-morbid) conditions

Condition	Current CD4+ lymphocyte count [ii,iii]	
	350-500	> 500
Asymptomatic HIV infection	C	D
Symptomatic HIV disease (CDC B or C conditions) incl. tuberculosis	R	R
Primary HIV infection	C	C
Pregnancy (before third trimester)	R	R
Conditions (likely or possibly) associated with HIV, other than CDC stage B or C disease:		
HIV-associated kidney disease	R	R
HIV-associated neurocognitive impairment	R	R
Hodgkin's lymphoma	R	R
HPV-associated cancers	R	R
Other non-AIDS-defining cancers requiring chemo- and/or radiotherapy	C	C
Autoimmune disease – otherwise unexplained	C	C
High risk for CVD (> 20 % estimated 10-yr risk) or history of CVD	C	C
Chronic viral hepatitis		
HBV requiring anti-HBV treatment	R	R
HBV not requiring anti-HBV treatment	C/R [iv]	D
HCV for which anti-HCV treatment is being considered or given	R [v]	D [vi]
HCV for which anti-HCV treatment not feasible	R	C

i The consideration to start ART may be individualized regardless of CD4-count and plasma HIV RNA level, especially if a patient is requesting ARV therapy and ready to start, and/or for any other personal reasons. **In serodiscordant couples, early initiation of ART as one aspect of the overall strategy to reduce HIV transmission to the seronegative partner should be considered and actively discussed.**

Time should be taken to prepare the patient, in order to optimize compliance and adherence.

Genotypic resistance testing and subtype determination is recommended prior to initiation of ART; ideally at the time of HIV diagnosis, otherwise before initiation of ART. If genotypic testing is not available, it is recommended to include a ritonavir-boosted PI in the first-line regimen.

Before starting treatment, the HIV RNA level and CD4-count should be repeated to obtain a baseline to assess subsequent response.

ii **ART is always recommended in any HIV-positive person with a current CD4-count below 350 cells/µL.**

iii **C**=use of ART should be considered; for patients under these circumstances, some experts would recommend starting ART whereas others would recommend deferral of ART; this clinical equipoise reflects that whereas certain evidence supports starting ART, this needs to be balanced against the risk of known or undiscovered adverse drug reactions from use of ART, and hence the risk/benefit ratio for use of ART under these circumstances has not yet been well defined.

D=defer initiation of ART.

R=use of ART is recommended.

iv Initiation of ART is recommended in those who are HBeAg-positive.

v Initiation of ART is recommended to optimize the outcome of HCV treatment.

vi HCV treatment to attempt eradication of HCV should be prioritized and ART deferred.

Initial combination regimen for antiretroviral-naive adult patients

SELECT 1 DRUG IN COLUMN A AND 1 NRTI COMBINATION IN COLUMN B (*)	A	B	REMARKS
Recommended (**)	**NNRTI**	ABC/3TC (vi) or TDF/FTC	• TDF/FTC co-formulated • ABC/3TC co-formulated
	• EFV (i) • NVP (ii)	TDF/FTC	• EFV/TDF/FTC co-formulated
	or ritonavir-boosted PI		
	• ATV/r (iii)	ABC/3TC (vi) or TDF/FTC	• ATV/r: 300/100 mg qd
	• DRV/r (iii)		• DRV/r: 800/100 mg qd
	• LPV/r (iv)		• LPV/r: 400/100 mg bid or 800/200 mg qd
	ITI		
	• RAL	TDF/FTC	• RAL: 400 mg bid
Alternative	SQV/r	• ZDV/3TC	• SQV/r: start with 500/100 mg then change to 1000/100 mg bid after one week
	FPV/r	• ddI/3TC or FTC (vii)	• FPV/r: 700/100 mg bid or 1400/200 mg qd
	MVC (v)		• ZDV/3TC co-formulated

* Generic HIV drugs are becoming more available and can be used as long as they replace the same drug and do not break recommended fixed dose combinations.

** Only timely registered drugs at the European level are taken into consideration.

i EFV: not recommended in pregnant women or women with no reliable and consistent contraception; not active on HIV-2 and HIV-1 group O.

ii NVP: Use with extreme caution in women with CD4 > 250 and men with CD4 > 400 µL and only if benefits outweigh the risk; not active on HIV-2 and HIV-1 group O.

iii Castle study (LPV/r vs. ATV/r) has shown better tolerability of ATV/r and Artemis study (LPV/r vs. DRV/r) better efficacy and greater tolerability of DRV/r.

iv ACTG 5142 randomised study showed lower virological efficacy of LPV/r vs. EFV while no PI mutations were seen in the LPV/r plus two nucleoside failures. However, PI mutations were seen on LPV/r + EFV.

v Unlicensed in Europe for naive patients.

vi ABC contra-indicated if HLA B*5701 positive. Even if HLA B*5701 negative, counselling on HSR risk still mandatory. ABC should be used with caution in patients with a high CVD risk and/or patients with a VL > than 100,000 c/mL.

vii Only if unavailability or intolerance to other recommended NRTIs.

Acute HIV infection

Definition of Acute primary HIV infection

- High-risk exposure within previous 2-8 weeks,
- and clinical symptoms,
- and detectable HIV in the plasma (p24 Ag and/or HIV RNA > 10 000 c/mL)
- and negative or indeterminate serologic testing (negative or weakly positive ELISA, and WB ≤ 1 band)
- Recommendation: confirm HIV infection by HIV antibody test (WB) performed 2 weeks later.

Treatment:

- Treatment indicated if:
  - AIDS defining events
  - Confirmed CD4 < 350 c/µL at month 3 or beyond
- Treatment should be considered if:
  - Severe illness/prolonged symptoms (especially CNS symptoms)
- If treatment of PHI is considered, patient should be preferably recruited into a clinical trial
- Treatment optional, if based only on theoretical considerations. In most situations, wait till month 6 (with CD4 and plasma HIV-RNA monitoring) and follow criteria for initiation of treatment in chronic HIV infection. Some experts recommend treatment as a tool for prevention of HIV transmission.
- Duration of treatment should be lifelong.
- Maintain closer follow-up in case of treatment interruption

Resistance testing:

- Recommended in all situations as soon as acute HIV infection is diagnosed, even if treatment not initiated
- In case it cannot be performed, store a plasma sample for testing.

Transmission:

- Recognize STIs, including syphilis, gonorrhoea, chlamydia (urethritis and LGV), HPV, hepatitis B and hepatitis C
- Counsel newly diagnosed patient on high risk of transmission and preventive measures (condoms) including notifying and testing partners.

Switch strategies for virologically suppressed patients (confirmed plasma viral load < 50 c/mL)

Indication:

1. **Switch for toxicity**
   - Documented toxicity
   - Management of potential drug interactions
   - Side effects
   - Planned pregnancy

2. **Switch for prevention of long-term toxicity**
   - Prevention of long-term toxicity (pre-emptive switch)
   - Ageing and/or co-morbidity with a possible negative impact of drug(s) in current regimen, e.g. on CVS risk, metabolic parameters.

3. **Switch for simplification**
   - Wish to simplify regimen
   - Actual regimen no longer recommended

Principles:

1. A boosted PI may be switched for simplification, prevention or improvement of metabolic abnormalities or adherence facilitation to unboosted atazanavir, an NNRTI or raltegravir only if full activity of the 2 NRTIs remaining in the regimen can be guaranteed.
2. Simplification of a complex multidrug regimen in antiretroviral-experienced patients with **1)** substitution of drugs difficult to administer (enfuvirtide) and/or with poor activity (NRTI in case of multiple NRTI resistance) and/or poor tolerability and **2)** addition of new well-tolerable, simpler and active agent(s).
3. Bid to qd NRTI switch for simplification, prevention of long-term toxicity
4. Intra-class switch if drug-specific related adverse event
5. PI/r to NNRTI switch for simplification, prevention or improvement of metabolic abnormalities, adherence facilitation. NVP has the advantage of its metabolic profile. EFV has the advantage of possible FDC of 3 drugs (Atripla).
6. Review the complete ARV history and available resistance test results
7. Avoid switching to a drug with a low genetic barrier in the presence of a backbone compromised by the possibility of archived class resistance

Strategies not recommended:

a. Intermittent therapy, sequential or prolonged treatment interruptions
b. 2-drug combination, i.e. 1 NRTI + 1 NNRTI or 1 NRTI + 1 PI without ritonavir or 1 NRTI + RAL, or 2 NRTIs
c. Triple NRTI combinations

Other strategy:

PI/r monotherapy with bid LPV/r or qd DRV/r might represent an option in patients with intolerance to NRTI or for treatment simplification. Such a strategy only applies to patients without history of failure on prior PI-based therapy and who have had viral loads < 50 c/mL in at least the past 6 months.

Virological failure

Definition	Confirmed plasma HIV RNA > 50 copies/mL 6 months after starting therapy (initiation or modification) in patients that remain on ART [(i)]
General measures	• Review expected potency of the regimen • Evaluate adherence, compliance, tolerability, drug-drug interactions, drug-food interactions, psychosocial issues • Perform resistance testing on failing therapy (usually routinely available for VL levels > 350-500 c/mL and in specialised laboratories for lower levels of viraemia) and obtain historical resistance testing for archived mutations • Tropism testing • Consider TDM • Review antiretroviral history • Identify treatment options, active and potentially active drugs/combinations
Management of virological failure (VF)	If plasma HIV RNA > 50 and < 500-1000 copies/mL • Check for adherence • Check plasma HIV RNA 1 to 2 months later If genotype not possible, consider changing regimen based on past treatment and resistance history If plasma HIV RNA confirmed > 500/1000 copies/mL, change regimen as soon as possible. What to change will depend on the resistance testing results: • No resistance mutations found: re-check for adherence, perform TDM • Resistance mutations found: switch to a suppressive regimen based on drug history; multidisciplinary expert discussion advised Goal of new regimen: plasma HIV RNA < 400 c/mL after 3 months, plasma HIV RNA < 50 c/mL after 6 months
In case of demonstrated resistance mutations	**General recommendations:** • Use at least 2 and preferably 3 active drugs in the new regimen (including active drugs from previously used classes) • Any regimen should use at least 1 fully active PI/r (e.g. darunavir/r) plus 1 drug from a class not used previously e.g. fusion, integrase or CCR5 antagonist (if tropism test shows R5 virus only), or 1 NNRTI (e.g. etravirine), assessed by genotypic testing • Defer change if < 2 active drugs available, based on resistance data, except in patients with low CD4-count (< 100 cells/μL) or with high risk of clinical deterioration for whom the goal is the preservation of immune function through partial reduction of plasma HIV RNA (> 1 log reduction) by recycling • If limited options, consider experimental and new drugs, favouring clinical trials (but avoid functional monotherapy) • Treatment interruption is not recommended • Consider continuation of 3TC or FTC in particular situations even if documented resistance mutation (M184V/I) If many options are available, criteria of preferred choice include: simplicity of the regimen, toxicity risks evaluation, drug-drug interactions, future salvage therapy

i Depending on the viral load assay, this limit could be higher or lower.

Treatment of HIV pregnant women

Pregnant women should be monitored every month and as close as possible to the predicted delivery date.

Criteria for starting ART in pregnant women (see different scenarios)	Same as for non pregnant
Objective of treatment in pregnant women	Full plasma HIV RNA suppression by third trimester and specifically at time of delivery
Resistance testing	Same as for non pregnant, i.e. before starting ART and in case of virological failure
SCENARIO	
1. Women becoming pregnant while already on ART	1. Maintain ART but switch drugs that are potentially teratogenic
2. Women becoming pregnant while treatment naive and who fulfil the criteria (CD4) for initiation of ART	2. Starting ART at beginning of 2nd trimester is optimal
3. Women becoming pregnant while treatment naive and who do not fulfil the criteria (CD4) for initiation of ART	3. Start ART at beginning of W28 of pregnancy (at the latest 12 weeks before delivery); start earlier if high plasma viral load or risk of prematurity
4. Women whose follow-up starts after W28 of pregnancy	4. Start ART immediately
Antiretroviral regimen in pregnancy	**Same as non pregnant**
	• Except avoid EFV
	• NVP not to be initiated but continuation is possible if started before pregnancy
	• Among PI/r, prefer LPV/r or SQV/r or ATV/r
	• RAL, DRV/r: little data available in pregnant women
	• ZDV should be part of the regimen if possible
Drugs contra-indicated during pregnancy	Efavirenz, ddI + d4T, triple NRTI combinations
IV zidovudine during labour	Benefit uncertain if plasma HIV RNA < 50 c/mL
Single dose nevirapine during labour	Not recommended
Caesarean section	Benefit uncertain if plasma HIV RNA < 50 c/mL at W34-36. In this case, consider vaginal delivery only

Suggested timing of ART initiation in TB/HIV coinfection according to CD4/µL

CD4-COUNT, CELLS/µL	WHEN TO START ART
< 100	As soon as possible and ideally within 2 weeks [(i)]
100–350	As soon as practical, but can wait until after completing 2 months TB treatment especially when there are difficulties with drug interactions, adherence and toxicities
> 350	At physician discretion

Concomitant use of anti-TB medications and antiretrovirals

- **NRTIs:** no significant interaction with rifampicin or rifabutin
- **NNRTIs:**
  - EFV and rifampicin: EFV 800 mg qd if weight > 60 kg, 600 mg qd if < 60 kg; rifampicin at standard dose. Some physicians prefer not to dose adapt efavirenz as data is controversial. In any case, TDM is recommended after 2 weeks
  - EFV and rifabutin: EFV at standard dose; rifabutin 450 mg daily
  - NVP: not recommended
  - Etravirine: not recommended
- **PIs**
  - and rifampicin: not recommended
  - and rifabutin: rifabutin 150 mg x 3 per week with ATV/r, DRV/r, LPV/r or SQV/r; PI/r at standard dose; monitor liver enzyme tests and, whenever possible, perform TDM for PI
- **Raltegravir**
  - and rifampicin: use with caution (only if no alternative), if used: raltegravir 800 mg bid
  - and rifabutin: can be given with raltegravir both in normal doses
- **Maraviroc**
  - and rifampicin: use with caution at double dose 600 mg bd maraviroc
  - and rifabutin: standard doses
- **Enfuvirtide:** no significant interaction with rifampicin or rifabutin

Where combinations are not recommended, specialist HIV treatment advice should be sought. TDM of NNRTI and PI should be performed when drug regimens contain one of these drugs. Drug levels of anti-tuberculosis drugs should be measured when there is clinical concern regarding absorption or response to TB therapy.

Recommended 1st line ARV combination in patients receiving anti-TB medication

Among recommended regimens for antiretroviral-naive patients, preference should be given to EFV/TDF/FTC with dose adaptation of EFV if needed (see above).

Alternative

- Recommended PI/r + TDF/FTC, using rifabutin instead of rifampicin
- Use with caution
  1. Raltegravir 800 mg bid + TDF/FTC with rifampicin
  2. If plasma viral load < 100,000 c/mL, fixed-dose combination of ZDV/ABC/3TC bid +/- tenofovir could also represent a short-term alternative until TB treatment has been completed.

If it is not possible to use these drugs because of resistance/intolerance, seek expert help.

i Be aware of IRS reaction in patients starting ARV at low CD4 levels and at early initiation. Corticoids could be considered as treatment of IRS in some settings

Post-exposure prophylaxis

	POST EXPOSURE PROPHYLAXIS (PEP) RECOMMENDED IF	
	Nature of exposure	**Status of source patient**
Blood	Subcutaneous or intramuscular penetration with IV or IM needle, or intravascular device	HIV + Or serostatus unknown but presence of HIV risk factors
	• Percutaneous injury with sharp instrument (lancet), IM or SC needle, suture needle • Contact > 15 min of mucous membrane or non intact skin	HIV +
Genital secretions	Anal or vaginal sex	HIV + Or serostatus unknown but presence of HIV risk factors
	Receptive oral sex with ejaculation	HIV +
Intravenous drug use	Exchange of syringe, needle, preparation material or any other material	HIV +

- Rapid testing of the source patient for HCV and HIV (if HIV status unknown) recommended
- If source patient HIV+ on ARV therapy, order resistance testing if VL detectable
- Individualise PEP according to the source's treatment history and previous resistance tests
- PEP to be started ideally < 4 hours after the exposure, and no later than 48 hours
- Duration of PEP: 4 weeks
- Standard PEP regimen: TDF/FTC (alternative: ZDV/3TC) + LPV/r tablets 400/100 mg bid
- Full sexual health screen in case of sexual exposure
- Follow-up:
  - HIV serology + HBV and HCV, pregnancy test (women) within 48 hours of exposure
  - Re-evaluation of PEP indication by HIV expert within 48-72 hours
  - Assess tolerability of PEP regimen
  - Transaminases, HCV-PCR and HCV serology at month 1 if source of exposure was HCV+ (observed or suspected)
  - Repeat HIV serology after 2 and 4 months, syphilis serology after 1 month if sexual exposure

Antiretroviral drugs & drug classes: **frequent/severe** side effects (i) 1/2

	Skin	Digestive	Liver	CV	Musculo-skeletal	Genitourinary	Nervous	Body fat	Metabolic	Other
NRTI										
ZDV	Nail pigmentation	Nausea	Steatosis		Myopathy			**Lipoatrophy**	Dyslipidaemia **Hyperlactataemia**	Anaemia
d4T		**Pancreatitis**	**Steatosis**				**Peripheral neuropathy**		**Dyslipidaemia** **Hyperlactataemia**	
ddI		**Pancreatitis**	Steatosis, Liver fibrosis	**IHD**					**Hyperlactataemia**	
3TC										
FTC										
ABC	**Rash ***			**IHD**						***: Systemic hypersensitivity (HLA B*5701 dependent)**
TDF					↓ BMD, Osteomalacia	↓ GFR **Fanconi syndrome**				
NNRTI										
EFV	Rash		Hepatitis				Depression, suicidal ideation **Dizziness, sleep disturbances**		**Dyslipidaemia** Gynaecomastia	Teratogenesis Reduced vitamin D level
NVP	**Rash**		**Hepatitis**							**Systemic hypersensitivity (CD4, gender, ART experience dependent)**
ETV	Rash									

Antiretroviral drugs & drug classes: **frequent/severe** side effects [i] 2/2

	Skin	Digestive	Liver	CV	Musculo-skeletal	Genitourinary	Nervous	Body fat	Metabolic	Other
PI										
IDV	**Dry skin** Nail dystrophy	Nausea and diarrhoea [ii]	Jaundice	**IHD**		**Nephrolithiasis**		**↑ abdominal fat**	**Dyslipidaemia** Diabetes mellitus	
SQVI									Dyslipidaemia	
LPV				**IHD**					**Dyslipidaemia**	
FPV	Rash			**IHD**					**Dyslipidaemia**	
ATV			Jaundice			**Nephrolithiasis**		↑ abdominal fat	Dyslipidaemia	
DRV	Rash								Dyslipidaemia	
TPV			**Hepatitis**				**Intracranial haemorrhage**		**Dyslipidaemia**	
Fusion inhibitors										
ENF	**Injection site reactions**									Hypersensitivity, ↑ risk for pneumonia
Integrase inhibitors										
RAL		Nausea			Myopathy		Headache			
CCR5 inhibitors										
MVC			Hepatitis	**IHD**						↑ risk for infections

i "Severe events" (events that can put patient's life at risk and represent a medical emergency) are marked in red. "Frequent events" (events expected in at least 10 % of treated patients) are marked in bold.

ii Frequency and severity differs between individual agents.

Drug-drug interactions between HIV drugs and non-HIV drugs [(i)]

	Non-HIV drugs	ATZ	DRV	LPV	RTV [(ii)]	EFV	ETV	NVP	MVC	RAL
CARDIOVASCULAR DRUGS	atorvastatin	↑	↑	↑	↑	↓	↓	↓*	↔	↔
	fluvastatin	↔*	↔*	↔*	↔*		↑*		↔*	↔*
	pravastatin	↔*	↑	↔	↔	↓	↓*	↔*	↔	↔
	rosuvastatin	↑	↑*	↑	↑	↔	↑*	↔	↔	↔
	simvastatin	↑	↑	↑	↑	↓	↓*	↓*	↔	↔
	amlodipine	↑*[(iii)]	↑*	↑*	↑*	↓*	↓*	↓*	↔*	↔
	diltiazem	↑[(iii)]	↑*	↑	↑	↓	↓*	↓	E*	↔
	metroprolol	↑*	↑*	↑*	↑*	↔*	↔*	↔*	↔*	↔*
	verapamil	↑*[(iii)]	↑*	↑*	↑*	↓*	↓*	↓*	E*	↔*
	warfarin	↑or↓*	↓	↓	↓	↑ or ↓*	↑*	↑ or ↓*	↔*	↔*
CNS DRUGS	diazepam	↑*	↑*	↑*	↑*	↓*	↑*	↓*	↔*	↔*
	midazolam	↑	↑	↑	↑	↑			↔	↔
	triazolam	↑	↑	↑	↑	↑			↔*	↔*
	citalopram	↑*	↑*	↑*	↑*	↓*	↑*	↓*	↔*	↔*
	mirtazapine	↑*	↑*	↑*	↑*	↓*	↓*	↓*	↔*	↔*
	paroxetine	↑*	↓	↑*	↑	↔	↔	↔*	↔*	↔*
	sertraline	↑*	↓	↑*	↑	↓	↓*	↓*	↔*	↔*
	pimozide	↑	↑	↑	↑	↑			↔*	↔*
	carbamazepine	↑D	↑	↑D	↑	↓D	D	↓D	D	D
	lamotrigine	↔**	↔*	↓	↓	↔*	↔*	↔*	↔*	↔*
	phenytoin	D	D	D	↓	↓D	D	↓D	D	D
ANTI-FECTIVES	clarithromycin	↑E	↑	↑	↑	↓	↓E	↓	E	↔*
	fluconazole	↔	↔*	↔	↔	↔	E	E	↔	↔
	itraconazole	↑E	↑E	↑E	↑	↓	↓E	↓	E	↔
	rifabutin	↑	↑E	↑	↑	↓	D			↔
	rifampicin	D	D	D	D	D	D	D	D	D
	voriconazole	↓	↓	↓	↓	↓E	↓E	↓E	E	↔
MISCELLANEOUS	antacids	D	↔	↔		↔	↔*	↔	↔*	E
	PPIs	D	↔	↔	↔	↔	↔	↔	↔*	E
	H2 blockers	D	↔	↔	↔	↔	↔	↔	↔*	E
	alfuzosin	↑	↑	↑	↑	↓*	↓*	↓*	↔*	↔*
	buprenorphine	↑	↑	↔	↑	↓	↓*	↓*	↔	↔
	budesonide ingal.	↑	↑	↑	↑	↔*	↔*	↔*	↔*	↔*
	ergot derivatives	↑	↑	↑	↑	↑	↑*		↔*	↔*
	ethinylestradiol	↑**	↓	↓	↓		↔	↓	↔	↔
	fluticasone inhal.	↑	↑	↑	↑	↔*	↔*	↔*	↔*	↔*
	methadone	↔	↓	↓	↓	↓	↔	↓	↔*	↔
	salmeterol inhal.	↑	↑	↑	↑	↔*	↔*	↔*	↔*	↔*
	sildenafil	↑*	↑	↑	↑	↓*	↓	↓*	↔*	↔
	St John's wort	D	D	D	D	D	D	D	D	↔

Comments:

i This table summarizes the drug-drug interactions between HIV therapy and some commonly prescribed co-medications as well as the drug-drug interactions of particular clinical relevance. This table is not exhaustive; for additional drug-drug interactions and for more detailed pharmacokinetic interaction data and dosage adjustments, refer to **www.hiv-druginteractions.org**.

ii Ritonavir dosed as a pharmacokinetic enhancer or as an antiretroviral agent.

iii ECG monitoring is recommended.

Legend:

↑ =	elevated exposure of non-HIV drug
↓ =	decreased exposure of non-HIV drug
↔ =	no significant effect
E =	elevated exposure of HIV drug
D =	decreased exposure of HIV drug
* =	prediction based on metabolic profiles of the drugs only, no clinical data from interaction study, absence of * indicates that clinical data are available
** =	effect with unboosted ATZ. Boosted ATZ ↓ lamotrigine and ethinylestradiol

Colour legend:

red =	these drugs should not be coadministered
amber =	potential interaction which may require close monitoring or alteration of drug dosage or timing of administration
green =	no clinically significant interaction expected

Note: the «traffic light» used to rank the clinical significance of the drug interaction refers to **www.hiv-druginteractions.org**

Part III Prevention and management of non-infectious co-morbidities in HIV

HIV-specific issues to be considered in managing "non-infectious" co-morbidities

Non-infectious co-morbidities include cardiovascular, renal, hepatic, metabolic, neoplastic and bone pathologies, central nervous system disorders and sexual dysfunction. Although HIV and other infections may be involved in their pathogenesis, this section of the EACS guidelines focuses on preventive and/or management principles other than use of antivirals and other anti-infectious agents in adults and adolescent HIV-infected persons.

These co-morbidities are becoming increasingly important for HIV-infected persons as a consequence of increased life expectancy resulting from effective ART. Additionally, several demonstrated and proposed HIV-associated risk factors may contribute to their development including immune activation, inflammation and coagulation associated with (uncontrolled) replication of HIV, coinfections (e.g. HCV), ART itself and persistent immunodeficiency.

Health care professionals involved with the care of HIV-infected persons who are not familiar with the use of ART should consult HIV specialists before introducing or modifying any type of treatment that HIV-infected patients receive.

Conversely, many HIV physicians are not specialists in non-infectious co-morbidities, and should seek expert advice where appropriate in the prevention and management of such conditions. Situations where consultation is generally recommended are indicated in these guidelines.

Preventing or managing these diseases in HIV often involves polypharmacy, which increases the risk of suboptimal adherence and hence may compromise the continued benefit of ART. Additionally, the possibility of drug-drug interactions with ART should be carefully considered prior to introducing any treatment. For this purpose, refer to **www.hiv-druginteractions.org**.

These guidelines are intended to provide the best guide to clinical management, and it is recognised that the level of evidence to support the advice varies. Indeed, there is limited evidence from randomised controlled trials on best management of non-infectious co-morbidities in HIV. As a result, current management is mainly derived from general medical guidelines. These guidelines therefore represent the collective consensus opinion of a panel of experts in the field of HIV and the respective range of co-morbidities, and no attempt to rate the underlying evidence and strength of the panel's recommendations was undertaken.

Depending on future clinical research findings, these guidelines will be regularly updated as required. The online version of the guidelines, at **www.europeanaidsclinicalsociety.org**, contains more detailed information and links to other relevant websites; this will be regularly updated.

The current guidelines highlight non-infectious co-morbidities that are seen frequently in the routine care of HIV-infected persons and those for which specific issues should be considered. Other related conditions in the management of HIV disease that are not extensively discussed, but may be included in future versions are:

- Women's health issues not already covered
- Neuropathy which may be caused by infections (e.g. HIV), some ARV (see **p. 20**), other neuropathic drugs, and metabolic diseases (e.g. diabetes)

Cancer - screening methods [i]

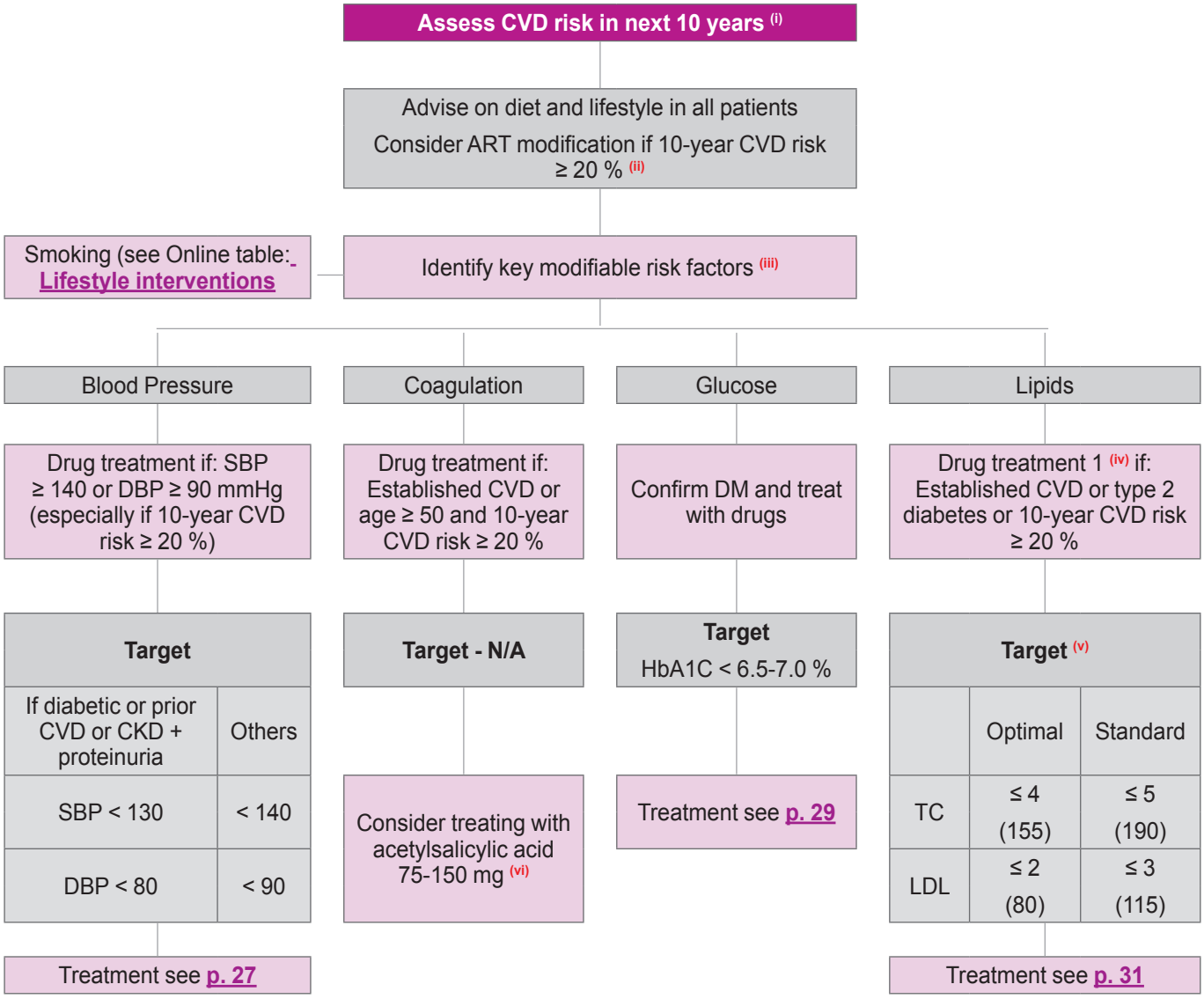
Problem	Patients	Procedure	Evidence of benefit	Screening interval	Additional comments
Anal cancer	Homosexual men	Digital rectal exam ± Papanicolau test	Unknown advocated by some experts	1-3 years	If Pap test abnormal, anoscopy
Breast cancer	Women 50-70 yrs	Mammography	↓ Breast cancer mortality	1-3 years	
Cervical cancer	Sexually active women	Papanicolau test	↓ Cervical cancer mortality	1-3 years	Target age group should include at least the age range 30 to 59 years. Longer screening interval if prior screening tests repeatedly negative
Colorectal cancer	Persons 50-75 yrs	Faecal Occult Blood test	↓ Colorectal cancer mortality	1-3 years	Benefit is marginal
Hepatocellular carcinoma	Persons with cirrhosis	Ultrasound and alphafoetoprotein	Diagnosis earlier allowing for improved ability for surgical eradication	Every 6 months	
Prostate cancer	Men > 50 yrs	Digital rectal exam ± prostate specific antigen (PSA)	Use of PSA is controversial	1-3 years	**Pros:** ↑ early diagnosis **Cons:** Overtreatment, no ↓ cancer-related mortality

i Screening recommendations derived from the general population. These screenings should preferably be done as part of national general population-screening programmes. Although non-Hodgkin's lymphoma has a higher incidence in HIV-infected patients than in the general population, it is currently unknown whether it can be screened.

Careful examination of skin should be performed regularly to detect cancers such as Kaposi's sarcoma, basal cell carcinoma and malignant melanoma.

Prevention of CVD

Principles: The intensity of efforts to prevent CVD depends on the underlying risk of CVD, which can be estimated [i]. The preventive efforts are diverse in nature and require involvement of a relevant specialist, in particular if the risk of CVD is high and always in patients with a history of CVD.



i Use the Framingham equation; a risk equation developed from HIV populations has been developed (see www.cphiv.dk/tools.aspx). This assessment and the associated considerations outlined in this figure should be repeated annually in all patients under care (see p. 6) to ensure that the various interventions are initiated in a timely way.

ii Options for ART modification include: **(1)** replace PI/r with NNRTI, RAL or by another PI/r known to cause less metabolic disturbances (see p. 20); **(2)** consider replacing d4T, ZDV or ABC with TDF or use a NRTI sparing regimen.

iii Of the modifiable risk factors outlined, drug treatment is reserved for certain subgroups where benefits are considered to outweigh potential harm. Of note, there is a combined benefit of various interventions in target groups identified. Per 10 mmHg reduction in systolic blood pressure, per 1 mmol/L (39 mg/dL) reduction in TC and with use of acetylsalicylic acid, each reduces risk of IHD by 20-25 %; the effect is additive. Observational studies suggest that smoking cessation results in greatest reductions in risk of IHD-50 % – and this is additive to other interventions.

iv See discussion on drug treatment of patients with lower CVD risk at www.nhlbi.nih.gov/guidelines/cholesterol/atp3_rpt.htm.

v Target levels are to be used as guidance and are not definitive – expressed as mmol/L with mg/dL in parenthesis. In case LDL cannot be calculated because of high triglyceride levels, the non-HDL-c (TC minus HDL-c) target should be used which is 0.8 mmol/L (30 mg/dL) higher than the corresponding LDL-c target. Target levels for TG are not listed because an independent contribution from TG to CVD risk is uncertain and hence whether this condition should be treated (see p. 31).

vi Evidence for benefit when used in persons without a history of CVD (including diabetics) is less compelling.

Hypertension: diagnosis and management - 1/2

BLOOD PRESSURE (mmHg) [i] LEVELS + DIAGNOSIS & GRADING OF HYPERTENSION					
Other risk factors and disease history	Normal: SBP 120-129 or DBP 80-84	High normal: SBP 130-139 or DBP 85-89	Grade 1: SBP 140-159 or DBP 90-99	Grade 2: SBP 160-179 or DBP100-109	Grade 3: SBP > 180 or DBP > 110
No other risk factors	Average risk	Average risk	Low added risk	Moderate added risk	High added risk
	No BP intervention	No BP intervention	Lifestyle changes for several months [ii], then possible drug therapy [iii]	Lifestyle changes for several months [ii], then drug therapy [iii]	Immediate drug therapy [iii] and lifestyle changes [ii]
1-2 risk factors [iv]	Low added risk	Low added risk	Moderate added risk	Moderate added risk	**Very high added risk**
	Lifestyle changes [ii]	Lifestyle changes [ii]	Lifestyle changes for several month [ii], then drug therapy [iii]	Lifestyle changes for several month [ii], then drug therapy [iii]	**Immediate drug therapy [iii] and lifestyle changes [ii]**
3 or more risk factors [iv] or target organ disease [v] or diabetes	Moderate added risk	High added risk	High added risk	High added risk	**Very high added risk**
	Lifestyle changes [ii]	Drug therapy [iii] and lifestyle changes [ii]	Drug therapy [iii] and lifestyle changes [ii]	Drug therapy [iii] and lifestyle changes [ii]	**Immediate drug therapy [iii] and lifestyle changes [ii]**
Associated clinical conditions [vi]	High added risk	**Very high added risk**	**Very high added risk**	**Very high added risk**	**Very high added risk**
	Drug therapy [iii] and lifestyle changes [ii]	**Immediate drug therapy [iii] and lifestyle changes [ii]**	**Immediate drug therapy [iii] and lifestyle changes [ii]**	**Immediate drug therapy [iii] and lifestyle changes [ii]**	**Immediate drug therapy [iii] and lifestyle changes [ii]**

i SBP = systolic blood pressure; DBP = diastolic blood pressure. Repeated blood pressure measurements should be used for stratification.

ii Recommended lifestyle interventions - see Online table: **Lifestyle interventions**. Table adapted from J. Hypertension 2003; 21:1779-86.

iii **See next page**

iv Risk factors include age (> 45 years for men; > 55 years for women), smoking, family history of premature CVD.

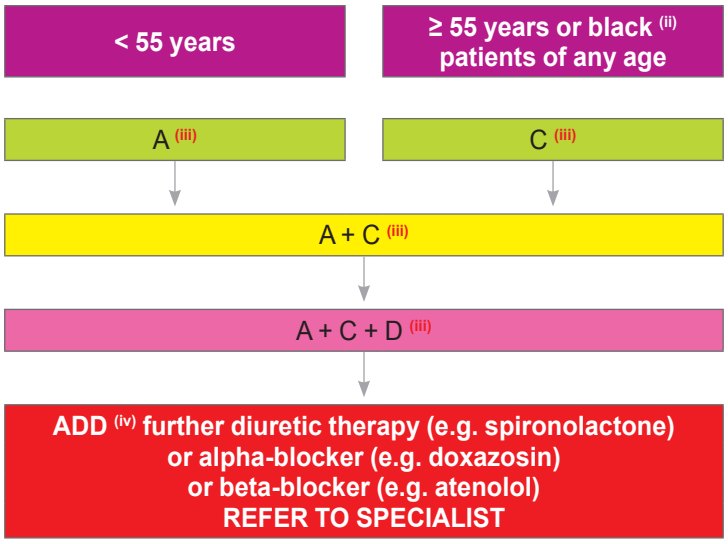
v Target organ disease: left ventricular hypertrophy, ultrasound evidence of arterial wall thickening, microalbuminuria.

vi Associated clinical conditions: CVD, IHD, renal disease, peripheral vascular disease, advanced retinopathy.

Warning: Caution regarding drug-drug interactions with antihypertensive drugs and ART.

Hypertension: diagnosis and management - 2/2

Choosing drugs [i] for patients newly diagnosed with hypertension



Abbreviations + details:

A ACE inhibitor (e.g. perindopril, lisinopril or ramipril) or low cost angiotensin receptor blockers (ARB) (e.g. losartan, candesartan)

C Dihydropyridine calcium-channel blocker (e.g. amlodipine). If not tolerated, verapamil (note: dose with caution with PIs which may increase plasma concentrations leading to toxic reactions), or diltiazem may be used

D Thiazide-type diuretic e.g. indapamide or chlorthalidone

i Several anti-hypertensive drugs interact with the pharmacokinetics of ART – check always for drug-drug interactions

ii Black patients are those of African or Caribbean descent, and not mixed-race, Asian or Chinese patients

iii Await 2-6 weeks to assess whether target (p. 26) is achieved – if not go to next step

iv Requirement of 4-5 drugs to manage hypertension needs specialist training

Diagnostic criteria [i]

	Fasting plasma glucose mmol/L (mg/dL) [ii]	Oral glucose tolerance test (OGTT) 2-h value mmol/L (mg/dL) [iii]	HbA1c [iv]
Diabetes	≥ 7.0 (126) OR →	≥ 11.1 (200)	≥ 6.5 %
Impaired glucose tolerance (IGT)	< 7.0 (126) AND →	7.8 – 11.0 (140 – 199)	Prediabetes 5.7-6.4 %
Impaired fasting glucose (IFG)	5.7– 6.9 (100 – 125)	< 7.8 (140)	

i As defined by WHO and International Diabetes Federation (2005)

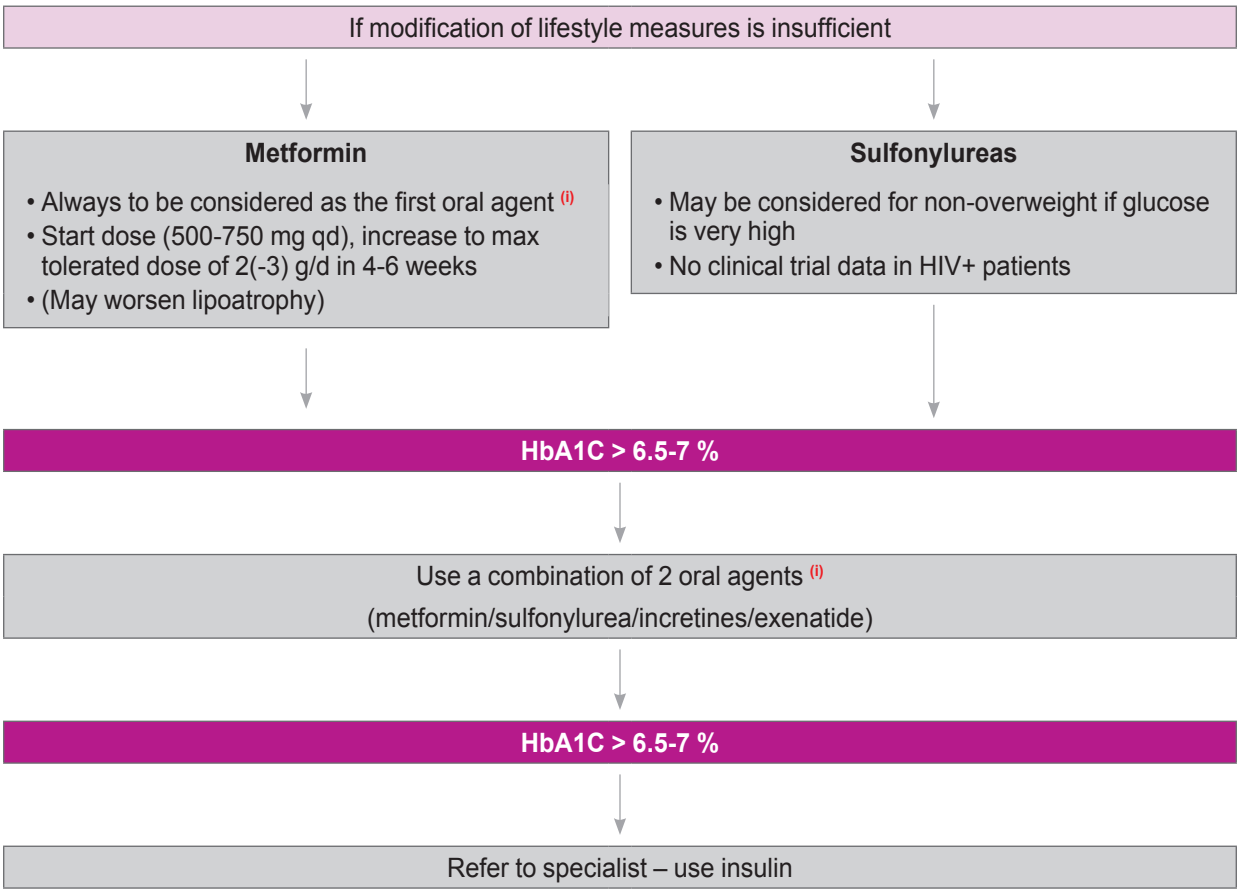
ii An abnormal finding should be repeated before confirming the diagnosis

iii Recommended in patients with fasting blood glucose 5.7 - 6.9 mmol/L (100-125 mg/dL) as it may identify patients with overt diabetes

iv Do not use HbA1c in presence of hemoglobinopathies, increased erythrocyte turnover and severe liver or kidney dysfunction. Falsely high values are measured under supplementation with iron, vitamin C and E as well as older age (age > 70: HbA1c +0.4 %)

Both IGT and IFG increase CV morbidity and mortality, and increase the risk of developing diabetes by 4-6 fold. These patients should be targeted for lifestyle intervention, and their CV risk factors must be evaluated and treated.

Interventions for treatment of diabetes



i Very limited data for incretins (e.g. liraglutide, saxagliptine, sitagliptine, vildagliptine) and exenatide in HIV patients; no clinically significant drug-drug interaction expected; clinical use of pioglitazone questioned by its side effects

Management of patients with diabetes

Treatment goals: glucose control (HbA1c < 6.5-7 % without hypoglycaemia, fasting plasma glucose 4-6 mmol/L (73-110 mg/dL)

- Normal blood lipids (see p. 31) and blood pressure < 130/80 mmHg (see p. 27)
- Acetylsalicylic acid (75-150 mg/d) considered in diabetics with elevated underlying CVD risk (see p. 26)
- Nephropathy, polyneuropathy and retinopathy screening should be performed as in diabetic patients without HIV
- Consultation with a specialist in diabetology is recommended

Dyslipidaemia: management

Principles:

Higher LDL-c levels increase risk of CVD and reduction thereof reduces this risk (see table below for drugs used on this indication); the reverse is true for HDL-c. The CVD risk implications from higher than normal TG levels are less clear, as TG independently does not predict well the risk of CVD and since the clinical benefit of treating moderate hypertriglyceridaemia is uncertain; very high TG (> 10 mmol/L or > 900 mg/dL) may increase risk of pancreatitis although direct evidence is lacking. Diet (more fish), exercise, maintaining normal body weight, reducing alcohol intake and stopping smoking tends to improve dyslipidaemia; if not effective, consider change of ART and then consider lipid-lowering medication in high-risk patients (see p. 26).

Drugs used to lower LDL-c

DRUG CLASS	DRUG	DOSE	SIDE EFFECTS	ADVISE ON USE OF STATIN TOGETHER WITH ART	
				use with PI/r	use with NNRTI
Statin (i)	Atorvastatin (ii)	10-80 mg qd	Gastrointestinal symptoms, headache, insomnia, rhabdomyolysis (rare) and toxic hepatitis	Start with low dose (v) (max: 40 mg)	Consider higher dose (vi)
	Fluvastatin (iii)	20-80 mg qd		Consider higher dose (vi)	Consider higher dose (vi)
	Pravastatin (iii)	20-80 mg qd		Consider higher dose (vi,vii)	Consider higher dose (vi)
	Rosuvastatin (ii)	5-40 mg qd		Start with low dose (v) (max: 20 mg)	Start with low dose (v)
	Simvastatin (ii)	10-40 mg qd		**Contraindicated**	Consider higher dose (vi)
Cholesterol uptake↓ (i)	Ezetimibe (iv)	10 mg qd	Gastrointestinal symptoms	No known drug-drug interactions with ART	

i A statin is preferred first-line therapy; different statins have variable intrinsic LDL-c lowering ability **ii, iii, iv**. Target levels for LDL-c: see p. 26. In persons where LDL-c targets are difficult to achieve, consult/refer to specialist

ii, iii, iv Expected range of reductions of LDL-c: **ii** 1.5-2.5 mmol/L (60-100 mg/dL), **iii** 0.8-1.5 mmol/L (35-60 mg/dL), **iv** 0.2-0.5 mmol/L (10-20 mg/dL)

v, vi The ART drug may **v** inhibit (statin toxicity, ↓ dose) or **vi** induce (=less effect of statin, ↑ dose gradually to achieve expected benefit **ii, iii**) the excretion of the statin

vii **Exception:** If used with **DRV/r**, start with lower dose of **pravastatin**

Depression: diagnosis and management

Significance

- Higher prevalence of depression in HIV-infected patients (20-40 % versus 7 % in general population) due to stigma, sexual dysfunction, side effects of cART, co-morbidities
- Significant disability associated with depression

Screening and diagnosis

Who?	How to screen	How to diagnose
Risk population • Positive history of depression in family • Depressive episode in personal history • Older age • Adolescence • Patients with history of drug addiction, psychiatric, neurologic or severe somatic co-morbidity • Use of EFV and other neurotropic - incl. recreational - drugs	• Screen every 1-2 years • Two main questions: 1. Have you often felt depressed, sad or without hope in the last few months? 2. Have you lost interest in activities that you usually enjoy? • Special symptoms in men: - Stressed, burn out, angry outbursts, coping through work or alcohol • Rule out organic cause (hypothyroidism, Addison's disease, non-HIV drugs, vit B12 deficiency)	**Symptoms – evaluate regularly** At least 2 weeks of depressed mood OR A. Loss of interest OR B. Diminished sense of pleasure **PLUS 4 out of 7 of the following:** 1. Weight change of ≥ 5 % in one month or a persistent change of appetite 2. Insomnia or hypersomnia on most days 3. Changes in speed of thought and movement 4. Fatigue 5. Feelings of guilt and worthlessness 6. Diminished concentration and decisiveness 7. Suicidal ideation or a suicide attempt

Management

Degree of depression	Number of symptoms (see diagnosis: A-C + 1-7)	Treatment	Refer to expert
No	< 4		
Mild	4	Problem-focused consultation, consider antidepressive treatment (i), recommend physical activity	• Severe depression • Depression not responding to treatment • Suicidal ideation • Complex situations such as drug addiction, anxiety disorders, personality disorders, dementia, acute severe life events
Intermediate	5-6	Start antidepressive treatment (i), consider referral	
Severe	> 6	Refer to expert	

i Maximum effectiveness reached after 10 weeks, one episode usually 6 months treatment. Optimize treatment, i.e. increase dosage or change drug if side effects. Partial or no response after 4-6 weeks of antidepressant treatment at adequate dosage: reassess diagnosis. Depression in persons ≥ 65 years generally requires relatively low doses of antidepressants. Preferred antidepressants for HIV-infected patients: sertralin, paroxetin, venlafaxine, citalopram, mirtazapin, but other antidepressants may also be given. Citalopram may be preferred because of low interactions. For classification, doses, safety and side effects of antidepressants, see p. 34

For interactions with antidepressants, see www.hiv-druginteractions.org and Interactions between antidepressants and antiretroviral agents

Classification, doses, safety and side effects of antidepressants

Mechanisms of action and classification	Starting dose	Standard dose	Lethality in overdose	Insomnia and agitation	Sedation	Nausea or gastro-intestinal effects	Sexual dysfunction	Weight gain
	mg/day							
Selective serotonin-reuptake inhibitors (SSRIs)								
Paroxetine	20	20-40	low	+	- or +	+	+	+
Sertraline	50	50-150	low	+	- or +	+	+	+
Citalopram	20	20-40	low	+	- or +	+	+	+
Mixed or dual-action reuptake inhibitors								
Venlafaxine	37-75	75-225	moderate	+	- or +	+	+	- or +
Mixed-action newer agents								
Mirtazapine (5-HT2 plus 5-HT3 plus α2-adrenergic receptors)	30	30-60	low	- or +	++	- or +	- or +	++

- = none; + = moderate; ++ = severe

Bone disease: diagnosis, prevention and management

CONDITION	CHARACTERISTICS	RISK FACTORS	DIAGNOSTIC TESTS
Osteopenia • Postmenopausal women and men aged ≥ 50 years T-score -1 to ≥ -2.5 **Osteoporosis** • Postmenopausal women and men aged ≥ 50 years T-score < -2.5 • Premenopausal women and men aged < 50 years Z-score ≤ -2 and fragility fracture	• Reduced bone mass • Increased risk of fractures • Asymptomatic until fractures occur **Common in HIV** • Up to 60 % prevalence of osteopenia • Up to 10-15 % prevalence of osteoporosis • Aetiology multifactorial • Loss of BMD observed with antiretroviral initiation	Consider classic risk factors [i] Consider DXA in any patient with ≥ 1 of: [ii] 1. Postmenopausal women 2. Men ≥ 50 years 3. History of low impact fracture or high risk for falls [iii] 4. Clinical hypogonadism (symptomatic - see table on sexual dysfunction, p. 47) 5. Oral glucocorticoid use (minimum 5 mg prednisone equivalent for > 3 months) Preferably perform DXA in those with above risk factors prior to ART initiation. Assess effect of risk factors on fracture risk by including DXA results in the FRAX® score (www.shef.ac.uk/FRAX) - Only use if > 40 years - May underestimate risk in HIV patients - Consider using HIV as secondary cause of osteoporosis [iv]	**DXA scan** **Rule out secondary causes if BMD abnormal** [v] **Lateral spine X-rays** (lumbar and thoracic) if BMD suggests osteoporosis, or significant height loss or kyphosis develops
Osteomalacia	• Defective bone mineralisation • Increased risk of fractures and bone pain • Vitamin D deficiency may cause proximal muscle weakness • High prevalence (> 80 %) of vitamin D insufficiency in some HIV cohorts	• Dietary deficiency • Lack of sunlight exposure • Dark skin • Malabsorption • Renal phosphate wasting	Measure 25-OH vitamin D in all patients at presentation Deficiency: < 10 ng/mL, < 25 nmol/L Insufficiency: < 20 ng/mL, < 50 nmol/L If deficient, check PTH levels Consider vitamin D replacement if clinically indicated (see vitamin D table, p. 36)
Osteonecrosis	• Infarct of epiphyseal plate of long bones resulting in acute bone pain • Rare but increased prevalence in HIV	**Risk factors:** • Advanced HIV disease (low CD4 + T-cell counts) • Glucocorticoid exposure • Intravenous drug use	**MRI**

i Classic risk factors: older age, female gender, hypogonadism, family history of hip fracture, low BMI (≤ 19 kg/m^2), vitamin D deficiency, smoking, physical inactivity, history of low impact fracture, alcohol excess (> 3 units/day), steroid exposure (minimum prednisone 5 mg or equivalent for > 3 months)

ii If T-score normal, repeat after 3-5 years in groups 1 and 2, no need for re-screening with DXA in groups 3 & 4 unless risk factors change and only rescreen group 5 if steroid use ongoing.

iii Falls Risk Assessment Tool (FRAT) (www.health.vic.gov.au/agedcare/maintaining/falls/downloads/ph_frat.pdf)

iv Hyperparathyroidism, hyperthyroidism, malabsorption, hypogonadism/amenorrhoea, autoimmune disease, diabetes mellitus, chronic liver disease

Vitamin D deficiency: diagnosis and management

Vitamin D	Test	Therapy [i]
Deficiency: < 10 ng/mL (< 25 nmol/L) [ii] **Insufficiency:** < 20 ng/mL (< 50 nmol/L)	25-hydroxyvitamin D (25[OH]D) If deficient, consider checking parathyroid hormone (PTH), calcium, phosphate [iii], alkaline phosphatase	If vitamin D deficient, replacement recommended: Various regimens suggested [iv] After replacement, maintenance with 800-2.000 U vitamin D daily
Factors associated with lower vitamin D: • Dark skin • Dietary deficiency • Avoidance of sun exposure • Malabsorption • Obesity • Chronic kidney disease • Some antiretrovirals [v]	Check vitamin D status in patients with history of: • low bone mineral density and/or fracture • high risk for fracture • chronic kidney disease Consider assessment of vitamin D status in patients with other factors associated with lower vitamin D levels (see left column)	Consider replacement in patients with vitamin D insufficiency [vi] and: • osteoporosis • osteomalacia • increased PTH (once the cause has been identified) Consider retesting after 6 months of vitamin D intake

i Can be provided according to national recommendations/availability of preparations (oral and parenteral formulations). Combine with calcium where there is insufficient dietary calcium intake. Consider that in some countries food is artificially fortified with vitamin D.

ii Some experts consider a value of ≤ 30 ng/mL as vitamin D deficiency. Low vitamin D has a prevalence of up to 80 % in HIV cohorts and was associated with increased risk for osteoporosis, type 2 diabetes, mortality and AIDS events. Consider seasonal differences (during winter approximately 20 % lower than during summer).

iii Consider that hypophosphataemia can be associated with TDF therapy. This phosphate loss through proximal renal tubulopathy may be independent of low vitamin D (see table "**Drug-associated nephrotoxicity**"). A combination of low calcium + low phosphate +/- high alkaline phosphatase may indicate osteomalacia and lack of vitamin D.

iv Expect that 100 U vitamin D daily leads to an increase of 1 ng/mL. Some experts prefer a loading dose of e.g.10.000 U vitamin D daily for 8-10 weeks in patients with vitamin D deficiency. The principal goal is to achieve a serum level > 20 ng/mL and to maintain normal serum PTH levels. The therapeutic aim is to maintain skeletal health; vitamin D supplementation has not been proven to prevent other co-morbidities in HIV-patients.

v The role of HIV-therapy or specific drugs remains unclear. Some studies suggest an association of efavirenz with reductions in vitamin D.

vi The implications of vitamin D levels that are below the physiological reference range but not markedly reduced and the value of supplementation are incompletely understood.

Kidney disease: diagnosis

		eGFR1 [i]		
		≥ 60 mL/min	30-59 mL/min	< 30 mL/min
Proteinuria [ii]	UP/C [iii] < 50	Regular Follow-up		• **Check risk factors for CKD and nephrotoxic medication including ART [iv]** • **Discontinue or adjust drug dosages where appropriate [v]** • **Perform renal ultrasound** • **Urgent referral to nephrologist**
	UP/C [iii] 50-100	• Check risk factors for CKD and nephrotoxic medication including ART [iv] • Discontinue or adjust drug dosages where appropriate [v] • Perform renal ultrasound • If haematuria present with any level of proteinuria refer to nephrologist. • Refer to nephrologist if new CKD or progressive decline in eGFR		
	UP/C [iii] > 100			

Management of HIV-associated renal disease [vi]

Prevention of progressive renal disease	Comment
1. Antiretroviral therapy	Start ART immediately where HIV-associated nephropathy (HIVAN) [vii] or HIV immune complex disease strongly suspected. Renal biopsy to confirm histological diagnosis recommended
2. Start ACE inhibitors or angiotensin-II receptor antagonists if: a. Hypertension, and/or b. Proteinuria	**Monitor eGFR and K+ level closely on starting treatment or increasing dose** a. Blood pressure target: < 130/ 80 mmHg
3. General measures: a. Avoid nephrotoxic drugs b. Lifestyle measures (smoking, weight, diet) c. Treat dyslipidaemia [viii] and diabetes [ix] d. Adjust drug dosages where necessary	CKD and proteinuria are independent risk factors for CVD

i eGFR: use aMDRD based on serum creatinine, gender, age and ethnicity. If not previously known to have CKD, reassess within 2 weeks

ii Urinalysis: use urine dipstick to screen for haematuria. To screen for proteinuria, use urine dipstick and if ≥ 1+ check UP/C, or screen with UP/C. Proteinuria defined as persistent if confirmed on ≥ 2 occasions > 2-3 weeks apart. If UP/C not available, use UA/C (see note **iii**)

iii UP/C in spot urine (mg/mmol) is preferred to UA/C as detects total urinary protein secondary to glomerular AND tubular disease. UA/C largely detects glomerular disease and can be used for screening for HIV associated renal disease where UP/C is not available, but is not appropriate for screening for tubular proteinuria secondary to drug nephrotoxicity (e.g. tenofovir). Screening values for UA/C are: < 30, 30-70 and > 70. UA/C should be monitored in patients with diabetes mellitus. UPC ratio is calculated as urine protein (mg/L) / urine creatinine (mmol/L), may also be expressed as mg/mg. Conversion factor for mg to mmol creatinine is x 0.000884.

iv Check risk factors for CKD, and repeat eGFR and urinalysis as per screening table (see p. 6)

v Dose modification of ARVs in case of impaired renal function: see online table for "Indications and tests for proximal renal tubulopathy"

vi Joint management with a nephrologist

vii HIVAN suspected if black ethnicity & UP/C > 100 mg/mmol & no haematuria

viii See p. 31

ix See p. 29

ART: Drug-associated nephrotoxicity

Renal abnormality	Antiretroviral drug	Management
Proximal tubulopathy: 1. Proteinuria: urine dipstick > 1, or confirmed clinically significant increase in UP/C [(i)] 2. Progressive decline in eGFR and eGFR < 90 mL/min [(ii)] 3. Phosphaturia [(iii)]: confirmed hyophosphataemia secondary to increased urine phosphate leak	**Tenofovir**	**Assessment:** • Tests for proximal renal tubulopathy/renal Fanconi syndrome [(iii)] • Bone DEXA scan if hypophosphataemia with phosphaturia **Consider stopping tenofovir if:** • Progressive decline in eGFR and no other cause • Confirmed significant hypophosphataemia of renal origin and no other cause • Significant osteopaenia in the presence of phosphaturia/renal tubulopathy
Nephrolithiasis: 1. Crystalluria 2. Haematuria [(iv)] 3. Leucocyturia 4. Loin pain 5. Acute renal insufficiency	**Indinavir** **Atazanavir**	**Assessment** • Urinalysis for crystalluria/stone analysis • Exclude other cause for nephrolithiasis • Renal tract imaging including CT scan **Consider stopping atazanivir/indinavir if:** • Confirmed renal stones. • Recurrent loin pain +/- haematuria
Interstitial nephritis: 1. Progressive decline in eGFR [(ii)] 2. Proteinuria/haematuria 3. Eosinophiluria (if acute)	**Indinavir (atazanavir)** [(v)]	**Assessment:** • Renal ultrasound • Refer nephrologist **Consider stopping indinavir if:** • Progressive decline in eGFR and no other cause

i UP/C in spot urine: urine protein/creatinine ratio in mg/mmol, detects total urinary protein including protein of glomerular or tubular origin. The urine dipstick analysis primarily detects albuminuria as a marker of glomerular disease and is inadequate to detect tubular disease.

ii eGFR: estimated glomerular filtration rate, according to the abbreviated MDRD formula (Modification of Diet in Renal Disease)

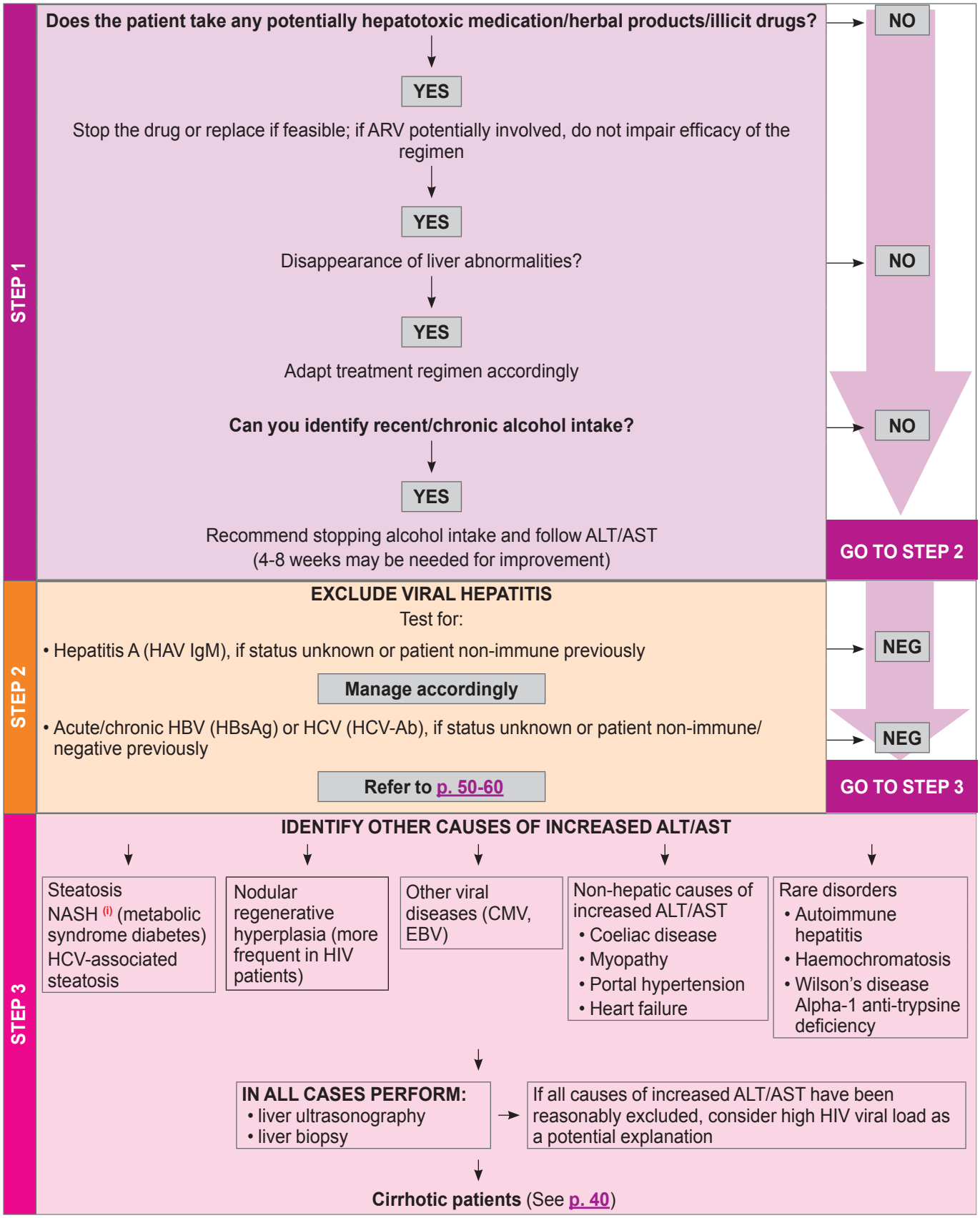
iii See online table for **"Indications and tests for proximal renal tubulopathy"**

iv Microscopic haematuria is usually present

v Atazanavir may cause decline in eGFR – also without clinical detected nephrolithiasis – but exact pathology and clinical significance remains unclear

Work-up and management of the HIV patient with increased ALT/AST

Identify potential cause of increased liver enzymes, using the following steps:



i Non alcoholic steato hepatitis

Management of HIV-positive patients with cirrhosis

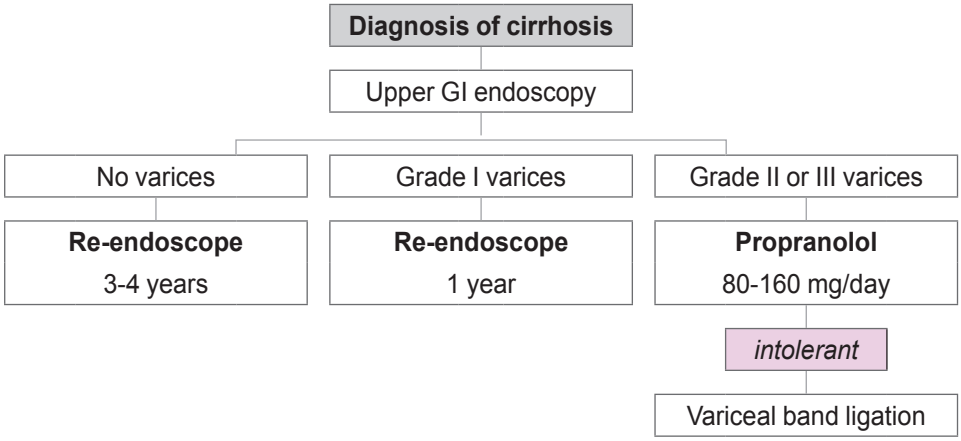
Management of patients with cirrhosis should be done in collaboration with experts in liver disease. More general management guidance is depicted below – for management of established complications from cirrhosis, see online **Management of HIV patients with liver cirrhosis**

Certain antiretrovirals with increased risk for hepatotoxicity such as tipranavir or nevirapine should preferably not be used in this particular patient population. In ESLD, increased drug levels of Efavirenz have been described to occur and may increase the risk for CNS toxicity. Nevertheless, it is important to highlight that ART initiation in cirrhotic patients independently has been demonstrated to improve overall survival and is therefore strongly recommended in these patients when indicated

Child-Pugh classification of the severity of cirrhosis			
	Point (*)		
	1	2	3
Total bilirubin, mg/dL (µmol/L)	< 2 (< 34)	2-3 (34-50)	> 3 (> 50)
Serum albumin, g/L (µmol/L)	> 35 (> 507)	28-35 (406-507)	< 28 (< 406)
INR	< 1.7	1.71-2.20	> 2.20
Ascites	None	Mild/Moderate (diuretic responsive)	Severe (diuretic refractory)
Hepatic encephalopathy	None	Grade I-II (or suppressed with medication)	Grade III-IV (or refractory)

(*) 5-6 points: Class A
7-9 points: Class B
10-15 points: Class C

Algorithm for surveillance for varices and primary prophylaxis



Nutrition of cirrhotic patient

Caloric requirements

- 25-30 Kcal/Kg/day of normovolemic body weight

Protein requirements

- Protein restriction is controversial but still routinely implemented (esp. in patients with TIPSS) (i)
- Amount: 40-60 g/day or 0.8 g/Kg.day (of normovolemic body weight)
- Type: rich in branched chain (non-aromatic) amino acids
- Some studies support that parental proteins carry less risk of encephalopathy since not converted by colonic bacteria into NH3

Micronutrients

- Thiamine, folic acid, Mg, Zn.

(i) TIPSS = Transjugular Intrahepatic Portosystemic Stent Shunt

Analgesia in patient with hepatic failure

- Although high-dose **acetaminophen** is a well-known hepatotoxin, most hepatologists permit the use of acetaminophen in patients with cirrhosis at doses up to 2 g/d.
- **NSAID** use may predispose patients with cirrhosis to develop GI bleeding. Patients with decompensated cirrhosis are at risk for NSAID-induced renal insufficiency, because of prostaglandin inhibition and worsening of renal blood flow
- **Opiate** analgesics are not contraindicated but must be used with caution in patients with preexisting hepatic encephalopathy.

Surveillance for hepatocellular carcinoma

- Ultrasound + alpha FP [(i)] every 6 months
- In case of suspicious lesion at US, perform CT scan (+arterial phase) or MRI
- Confirm diagnosis by fine needle aspiration or biopsy
- In case of alpha FP > 400 mg/mL [(i)] and hypervascular lesion, no histology is needed

When to refer for liver transplantation [(ii)]

Best to refer early as disease progresses rapidly =
MELD [(ii)] score 10-12 (listing at 15)

- Decompensated cirrhosis
  - Ascites
  - Encephalopathy
  - Variceal bleeding
- Early hepatocellular carcinoma

i Alpha-fetoprotein (alpha FP) may also be expressed in µg/L (cut-off value of 400 is the same)

ii Unit for both S-creatinine and S-bilirubin is mg/dL (see p. 40 for conversion from µmol/L). MELD Score = 10 {0,957 Ln (serum creatinine (mg/dL)) + 0.378 Ln (total bilirubin (mg/dL)) + 1.12 Ln (INR) + 0.643}

Lipodystrophy: prevention and management

LIPOATROPHY	LIPOHYPERTROPHY
Prevention • Avoid d4T and ZDV or pre-emptively switch away from them • Regimens containing ritonavir-boosted PIs lead to more limb fat gain than regimens containing NNRTIs • Regimens not containing NRTIs lead to more fat gain than regimens containing NRTIs • CCR5 and integrase inhibitors have not been associated with lipoatrophy in registrational studies, although not in formal comparative studies **Management** • Modification of ART - Switch d4T or ZDV to ABC or TDF: ▪ Only ART modification proven to partially restore subcutaneous fat; increase in total limb fat ~400-500 g/year ▪ Risk of toxicity from new drug (see p. 20) - Switch to regimen not including NRTIs ▪ Increase in total limb fat ~400-500 g/year ▪ May increase risk of dyslipidaemia • Surgical intervention - Offered for relief of facial lipoatrophy only	**Prevention** • No proven strategy. • ATV/r has been associated with more central fat gain than EFV • Weight gain expected with effective ART reflecting “return to health” type of response • Weight reduction or avoidance of weight gain may decrease visceral adiposity • Avoid inhaled fluticasone (and potentially other inhaled corticosteroids) with ritonavir-boosted PI as it may cause Cushing syndrome or adrenal insufficiency **Management** • Diet and exercise may reduce visceral adiposity - Limited data, but possibly reduction of visceral adipose tissue and improvement in insulin sensitivity and blood lipids, especially in obesity associated with lipohypertrophy - No prospective trials in HIV-infected patients to definitely indicate degree of diet and/or exercise needed to maintain reduction in visceral fat - May worsen subcutaneous lipoatrophy • Pharmacological interventions to treat lipohypertrophy have not been proven to provide long-term effects and may introduce new complications - Growth hormone ▪ Decreases visceral adipose tissue ▪ May worsen subcutaneous lipoatrophy and insulin resistance - Tesamorelin [i] - Metformin ▪ Decreases visceral adipose tissue in insulin resistant persons ▪ May worsen subcutaneous lipoatrophy - Surgical therapy can be considered for localised lipomas/buffalo humps ▪ Duration of effect variable

i Tesamorelin (growth hormone releasing factor) was shown to reduce visceral adipose tissue volume but this effect was lost on discontinuation; the drug is not currently licensed in Europe

Travel

General precautions	• Delay travel until clinically stable and treatment established • Provide drug prescription and referral letter for emergencies • Provide medical attestation for import of personal medication/syringes • Carry antiretrovirals split between suitcase and hand luggage • Beware of fake drugs
Antiretroviral treatment	• Maintain hours of medication (e.g. 23.00) when switching time zones, shortening the interval to the next dose when flying east
Acknowledge increased susceptibility [i] of HIV+	**1. Observe food hygiene** • Bacterial enterocolitis — • e.g. Salmonella, Shigella, Campylobacter • Intestinal parasitosis — • Cyclospora, Cryptosporidium, Isospora, Microsporidia **2. Prevent insect bites** • Malaria — • chemoprophylaxis/emergency treatment [ii] • Yellow fever — • cf. vaccination table • Leishmaniasis — • beware of sand flies (dogs)

Advice on travel restrictions – see: **www.hivtravel.org**

i Higher susceptibility due to HIV-associated GALT destruction, low CD4

ii According to malaria risk at travel destination and national guidelines; adherence counselling is particularly important in patients visiting friends and relatives

Vaccination

- Vaccinate according to national guidelines for healthy population
- As vaccine responses may be significantly lower in HIV+, antibody titres should be considered to assess the indication and effectiveness of vaccinations
- Consider repeating vaccines performed at CD4 < 200/µL (14 %) after immune reconstitution
- For attenuated live vaccines [(i)] (in addition to restrictions for general population):
  - **Varicella, measles, mumps, rubella, yellow fever** contraindicated if CD4 < 200/µL (14 %) and/or AIDS
  - **Oral typhoid, oral polio (OPV)** contraindicated as inactivated vaccines are available

	Vaccination rationale in HIV+	comment
Varicella	Higher rate and severity of both chickenpox and zoster	Vaccinate if seronegative
Streptococcus pneumoniae	Higher rate and severity of invasive disease	• In adults use PPV-23 polysaccharide vaccine [(ii)] • Consider delaying vaccination until CD4 ≥ 200/µL • Consider (single) booster after 5 years [(iii)]
Influenza		Yearly
Human Papillomavirus	Shared risk with HIV of contracting infection. Higher rate of cervical and anal cancer	Vaccination of women and men according to national guidelines
Hepatitis B	Shared risk with HIV of contracting infection. HIV accelerates liver disease progression	Consider double dose (40 µg) and intradermal vaccination in non-responders, in particular with low CD4 and high viraemia. Repeat doses until HBs antibodies ≥ 10 IU/L / ≥ 100 IU/L according to national guidelines
Hepatitis A	According to risk profile (travel, MSM, IVDU, active hepatitis B or C infection)	Check antibody titres in high risk population
Yellow fever	Mandatory for travel to selected countries (provide exemption letter if no true risk of exposure)	• Contraindicated if past or current haematological neoplasia or thymus affection • Relatively contraindicated at age > 60y

i Administer live vaccines simultaneously or with an interval of 4 weeks

ii 13-valent conjugated vaccine may replace 23-valent polysaccharide vaccine as more immunogenic

iii Repetitive boosting may attenuate immune response

Hyperlactataemia: diagnosis, prevention and management [(i)]

Risk factors	Prevention/Diagnosis	Symptoms
• Use of ddI > d4T > ZDV • HCV/HBV coinfection • Use of ribavirin • Liver disease • Low CD4-cell count • Pregnancy • Female sex • Obesity	• Avoid d4T + ddI combination • Routine monitoring of serum lactate levels not recommended - does not predict risk of lactic acidosis. • Measurement of serum lactate, bicarbonate & arterial blood gases + pH indicated in case of symptoms suggestive of hyperlactataemia • Close monitoring for symptoms if > 1 risk factor	• Hyperlactataemia: unexplained nausea, abdominal pain, hepatomegaly, elevated ALT and/or AST, weight loss • Acidaemia: asthenia, dyspnoea, arrhythmias • Guillain-Barré-like syndrome

i For management of lactic acidosis, see online table: Management of hyperlactataemia and management of lactic acidosis.

Assessment of sexual dysfunction in people living with HIV

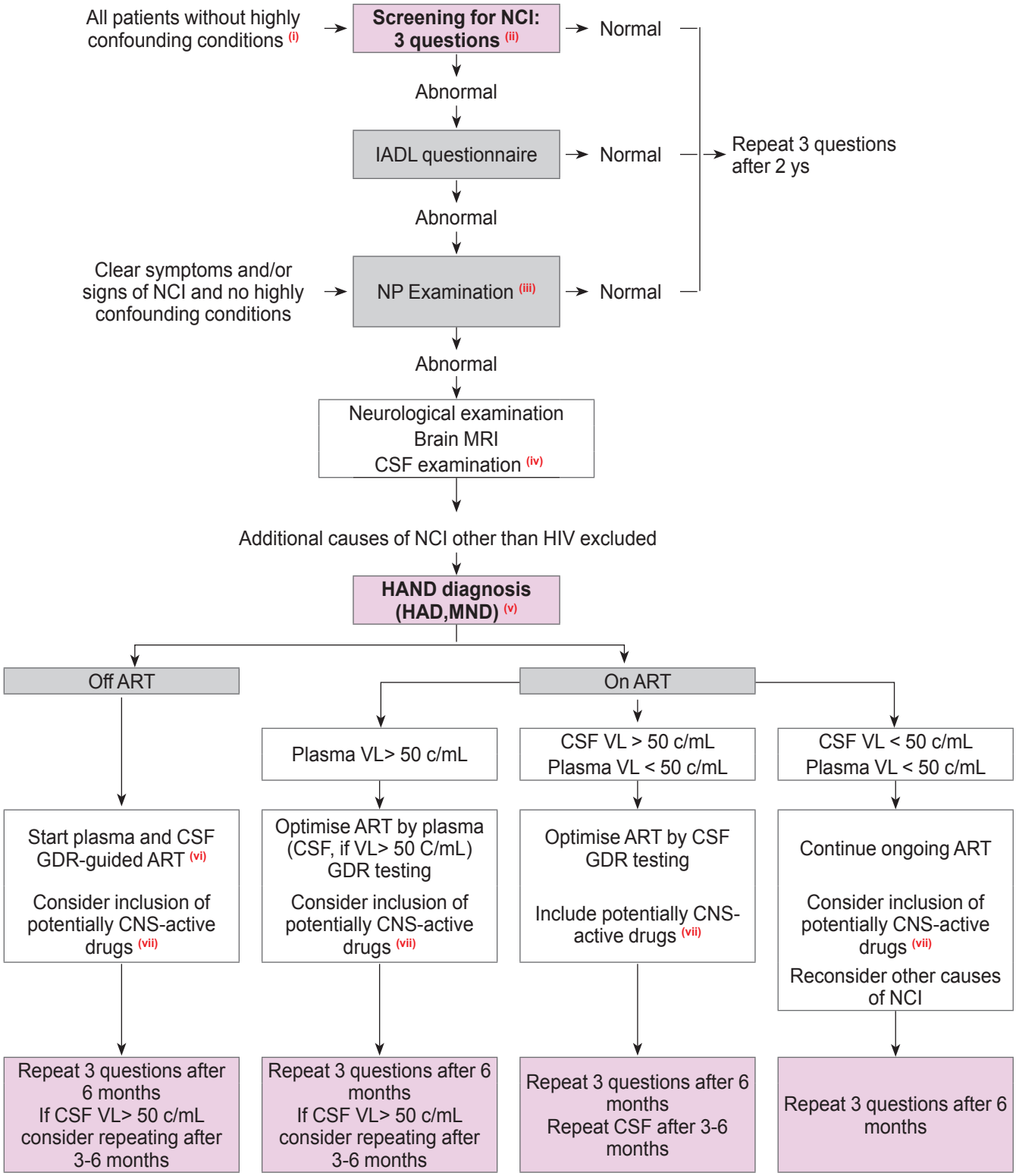
Sexual dysfunction has been reported as a common problem in HIV-positive men (M) and women (W). The reduction in quality of life is also likely to be under-diagnosed. Guidelines for treatment of sexual dysfunction in the general population are available for men but not women. Referral to endocrinologist, clinical psychologist, cardiologist, clinical pharmacologist, when appropriate, should be advised.

STEP 1	**Taking a general sexual history:**	Screening questions for all HIV+ persons:	*How satisfied are you about your sex life? Do you experience sexual difficulties that need attention? Need for STD prevention? Contraception? Hopes of starting a family?*	
STEP 2	**When sexual complaints exist:**	*What is the exact nature of the problem? In which phase(s) of the sexual response cycle does the problem occur?*	**1. Desire** (Lack of sexual desire (libido); desire discrepancy with partner; aversion to sexual activity)	
			2. Arousal (difficulties with physical and/or subjective sexual arousal; difficulties or inability to achieve or sustain an erection of sufficient rigidity for sexual intercourse **(M)** – (i.e. erectile dysfunction); lack or impaired nocturnal erections **(M)**; difficulties lubricating **(W)**; difficulties sustaining arousal	
			3. Orgasm (difficulties experiencing orgasm)	
			4. Pain (pain with sexual activity; difficulties with vaginal/anal penetration (anxiety, muscle tension); lack of sexual satisfaction and pleasure	
STEP 3	**Identify the causes:**	*Psychological or sociological problems?*	Stigma, body image alteration, depression? Fear of infecting an HIV-negative partner?	**Refer to clinical psychologist**
		Relevant co-morbidity?	Cardiovascular disease (note: if complete sexual response possible - e.g. with another partner, with masturbation or nocturnal - then no major somatic factors are involved)	**Refer to urologist, andrologist, cardiologist**
		Relevant medication, drugs, lifestyle factors?	Drugs associated with sexual dysfunction: **(1)** psychotropics (antidepressant, antiepileptics, antipsychotics, benzodiazepines), **(2)** lipid lowering drugs (statins, fibrates), **(3)** antihypertensives (ACE-inhibitors, betablockers, alfablockers), **(4)** others (omeprazole, spironolactone, metoclopramide, finasteride, cimetidine); **(5)** contribution from antiretroviral drugs is controversial and benefit from switching studies is not proven.	**Refer to clinical pharmacologist**
		Signs of hypogonadism in men?	Signs of testosterone insufficiency (reduced sexual arousability and libido; decreased frequency of sexual thoughts and fantasies; decreased or absent nocturnal erections; decreased genital sensitivity; loss of vitality; fatigue; loss of muscle mass and muscle strength and decreased body hair)	**Refer to endocrinologist**

Treatment of sexual dysfunction in men living with HIV

Treatment of Erectile dysfunction	Treatment of Premature ejaculation
Primarily oral PDE5-Is (sildenafil, tadalafil, vardenafil). • All at least 30 minutes before initiation of sexual activity • Use lower dose if on PI/r - sildenafil (25 mg every 48 hours) - tadalafil 5 mg initial dose with maximum dose 10 mg in 72 hours - vardenafil 2.5 mg maximum dose in 72 hours • Higher doses may be required if on EVR • Tadalafil also licensed for use as an everyday ongoing therapy	Consider behavioural interventions and/or psychosexual counselling. SSRIs, tricyclic antidepressant, clomipramine, and topical anaesthetics. • Use lower dose of clomipramine and other tricyclic antidepressants if on PI/r • Dapoxetine, short-acting SSRI, only drug approved for the on-demand treatment of premature ejaculation in Europe • Treatment must be maintained as recurrence is highly likely following withdrawal of medication

Algorithm for diagnosis and management of HIV-associated Neurocognitive Impairment (NCI)



Abbreviations

- ANI=Asymptomatic Neurocognitive Impairment
- CSF=Cerebrospinal Fluid
- GDR=genotypic drug resistance test
- HAD=HIV-Associated Dementia
- HAND=HIV-Associated Neurocognitive Disorder
- IADL=Instrumental Activities of Daily Living
- MND=Mild Neurocognitive Disorders
- MRI=Brain Magnetic Resonance Imaging
- NP=Neuropsychological

i **Highly confounding conditions**

1. Severe psychiatric conditions
2. Abuse of psychotropic drugs
3. Alcohol abuse
4. Sequelae from previous CNS-OIs or other neurological diseases
5. Current CNS-OIs or other neurological diseases

ii **3 questions** (ref. Simioni et al., AIDS 2009)

1. Do you experience frequent memory loss (e.g. do you forget the occurrence of special events even the more recent ones, appointments, etc.)?
2. Do you feel that you are slower when reasoning, planning activities, or solving problems?
3. Do you have difficulties paying attention (e.g. to a conversation, a book, or a movie)?

For each question, patients can answer: a) never, b) hardly ever, or c) yes, definitely.

Patients are considered to have an "abnormal" result when answering "yes, definitely" on at least one question.

iii NP examination will have to include tests exploring the following cognitive domains: fluency, executive functions, speed of information processing, attention/working memory, verbal and visual learning, verbal and visual memory, motor skills (ref. Antinori et al., Neurology 2007).

iv **Brain MRI and CSF examination**

These are required to further exclude other pathologies and to further characterize HAND, by including assessment of CSF HIV-RNA level and, where appropriate, evidence for genotypic drug resistance (GDR) in a paired CSF and plasma sample.

v **HAD and MND definitions** (ref. Antinori et al., Neurology 2007).

- **HAD is defined in the presence** of **1)** **marked** acquired impairment in cognitive functioning involving **at least 2** cognitive domains, as documented by performance of at least 2 SD below the mean for age-education appropriate norms on NP tests; **2)** **marked** interference in daily functioning; **3)** no evidence of another pre-existing cause for the dementia
- **MND is defined in the presence** of **1)** acquired impairment in cognitive functioning involving at least 2 cognitive domains, as documented by performance of **at least 1 SD** below the mean for age-education appropriate norms on NP tests; **2)** **mild** interference in daily functioning; **3)** no evidence of another pre-existing cause for the MND

vi If GDR in CSF and/or plasma not available, store aliquots for possible future use

vii **Definition of 'potentially CNS-active' drugs**

ARV drugs with either demonstrated clear CSF penetration when studied in healthy HIV-infected populations (concentration above the **IC90** in > 90 % examined patients) or with proven short-term (3-6 months) efficacy on cognitive function or CSF viral load decay when evaluated as single agents or in controlled studies in peer-reviewed papers:

- Agents with demonstrated clear CSF penetration:
  - NRTIs: ZDV, ABC
  - NNRTIs: EFV, NVP
  - Boosted PIs: IND/r, LPV/r, DRV/r
  - Other classes: MAR
- Drugs with proven "efficacy":
  - NRTIs: ZDV, d4T, ABC
  - Boosted PIs: LPV/r

Part IV Clinical management and treatment of chronic hepatitis B and C coinfection in HIV-infected adults

These Euroguidelines result from the short statement of the first European Consensus conference on the treatment of chronic hepatitis B and C in HIV coinfected patients (J Hepatol 2005; 42:615-624),

the updated recommendations from the HCV-HIV International Panel (Soriano V, Puoti M, Sulkowski M, Cargnel A, Benhamou Y, Peters M, Mauss S, Bräu N, Hatzakis A, Pol S, Rockstroh J: Care of patients coinfected with HIV and hepatitis C virus. AIDS 2007; 21:1073-1089),

the previous recommendations from the hepatitis panel of the European AIDS Clinical Society (JK Rockstroh, S Bhagani, Y Benhamou, R Bruno, S Mauss, L Peters, M Puoti, V Soriano & C Tural) and the EACS Executive Committee: European AIDS Clinical Society (EACS) Guidelines for the Clinical Management and Treatment of Chronic Hepatitis B and C Coinfection in HIV-infected Adults. HIV Medicine 2008; 9, 82–88)

as well as the revised website version from 2009 and from a discussion with the Coinfection panel.

General recommendations in patients with HIV and hepatitis coinfection

SCREENING

1. All HIV-infected patients should be screened for hepatitis C at diagnosis and then on an annual basis. Screening for HCV in HIV-infected patients should be done using an anti-HCV antibody test. A positive result should be followed by evaluation for the presence of HCV-RNA and the genotype should be determined. Patients with risk factors (ongoing IVDU, mucosal traumatic sex, ongoing unprotected anal intercourse, recent sexually transmitted infection) with unexplained increase in hepatic transaminases and a negative HCV antibody test should be offered an HCV-RNA test for early detection of a recent infection.
2. HIV-infected patients should be screened for hepatitis A and B. Patients from high prevalence countries for HBV, in particular those with elevated liver transaminases, should be screened for HBV-DNA in addition to HBs Ag to rule out occult HBV infection.
3. Hepatitis delta antibodies should be screened for in all HBsAg+ patients.
4. Patients with liver cirrhosis should be screened at 6-monthly intervals with serum alpha-fetoprotein and hepatic ultrasound for the occurrence of hepatocellular carcinoma. Routine screening is also advised for oesophageal varices at the time of diagnosis and at 1-2 year intervals thereafter. For non-cirrhotic HBV co-infected patients, HCC screening with 6-12 monthly US scans may be advisable for African patients over the age of 20, Asian patients over the age of 40, patients with a family history of HCC, and patients with high HBV DNA levels (> 2 000 IU/mL).

VACCINATION

5. Patients lacking anti-HAV IgG antibodies or anti-HBs antibodies should be offered vaccination for the respective virus to prevent infection regardless of their CD4-count. The response to the HBV vaccine is influenced by the CD4-count and level of HIV-RNA. In patients with low CD4-counts (< 200/µL) and ongoing HIV replication, ART should be initiated first prior to respective vaccination. HBsAg negative, anti-HBc only positive should be tested for anti-HBs, anti-HBe and HBV-DNA. Those without any corroborating markers for past HBV infection, or active occult infection, should also be offered vaccination against HBV. Anti-HBs response should be measured 2-4 weeks after a first HBV vaccination and if anti-HBs < 10 IU/L consider a full course of vaccination.

   In case of insufficient response (anti-HBs < 10 IU/L), revaccination should be considered. Double-dose revaccination (40 µg) at 3-4 vaccination time points (months 0, 1, 6 and 12) may help to improve response rates to HBV vaccination. Patients who fail to seroconvert after hepatitis B vaccination and remain at risk for HVB infection should have annual serological tests for evidence of HBV infection.

ART

6. Hepatitis B and/or C coinfected patients benefit from early ART because liver fibrosis progression is reduced with immune reconstitution and suppression of HIV-RNA. Thus, ART initiation with a TDF-based regimen is recommended in all HBV coinfected patients with the need of anti-HBV therapy irrespective of CD4-counts, and in all HBs-Ag positive patients with less than 500 CD4-cells irrespective of HBV disease status to prevent transition to a more active HBV disease state due to immune suppression. In patients with chronic hepatitis C, ART initiation is recommended when CD4-counts drop below 500/µL. Stopping ART has been associated with enhanced risk for AIDS and non-AIDS related events in the SMART study and this risk was enhanced for patients with hepatitis coinfection. Particular prudence is warranted in HIV/HBV coinfected patients who stop anti-HBV containing ART.

END STAGE LIVER DISEASE (ESLD)

See “Management of HIV-positive patients with cirrhosis” - p. 40

PREVENTION/SUPPORT

7. Psychiatric, psychological, social and medical support should be made available to patients with alcohol intake to stop drinking.
8. Substitution therapy (opioid substitution therapy, see online table: **Drug dependency and drug addiction**) in patients with active drug abuse as a step towards cessation of active drug use should be considered; help provided (e.g. through needle and syringe exchange programme) reduces the risk of re-infection including parenteral viral transmission (harm reduction strategy).
9. Since HBV and HIV, and occasionally HCV, are transmitted sexually, adequate counselling including the use of condoms is advisable. Information on the risk of HCV transmission due to mucosal traumatic sexual practices associated with a high likelihood of blood contact should be provided and risk reduction should be discussed.

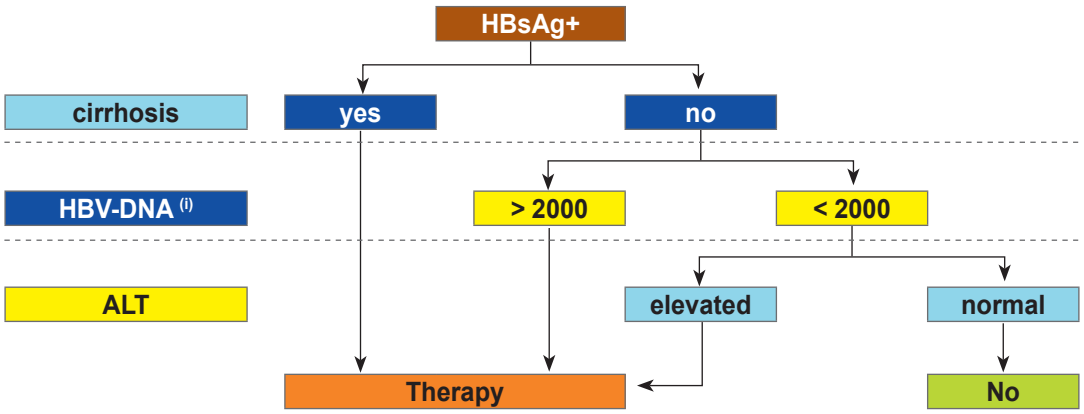
Delta virus

In patients with Delta virus coinfection and significant liver fibrosis (> F2) long term (> 18 months) treatment with pegylated interferon might be considered in association with TDF-based ART. TDF has showed some efficacy, especially in patients with detectable serum HBV-DNA. Treatment efficacy should be monitored with: HBV-DNA and HDV-RNA measurement, when available, and with follow-up of biochemical and liver fibrosis estimates.

Patients with anti-HCV Ab and HCV-RNA reactivity should be offered anti-HCV treatment in order to induce a sustained virologic response for HCV coinfection. Anti-HDV pegylated interferon treatment could be interrupted according to patient’s tolerance and then reinitiated in case of liver disease worsening. Persistent off-treatment HDV-RNA negativity and anti-HBs seroconversion are the ideal goals of antiviral treatment even if they can only be obtained in a minority of patients.

Histological remission of liver disease is a less ambitious but more likely achievable goal. In patients with ESLD or HCC, liver transplantation should be strongly considered especially in the absence of active HCV coinfection.

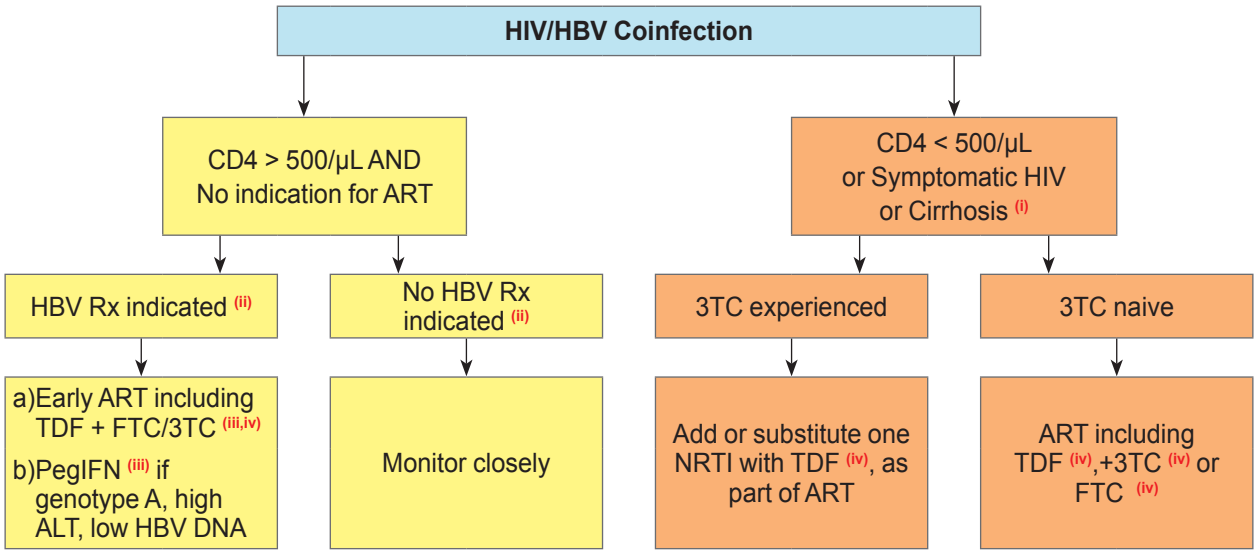
Assessment of treatment indication for HBV infection in HIV-positive individuals



Note: In patients with significant liver fibrosis (F2-F3), anti-HBV treatment might be considered even when serum HBV-DNA is below 2 000 IU/mL and liver enzymes are not elevated.

i IU/mL

Treatment of chronic HBV infection in HIV-positive individuals



i Cirrhotic patients should be referred for variceal assessment, have regular HCC monitoring and be referred early for transplant assessment. Patients with liver cirrhosis and low CD4-counts require careful surveillance in the first months after starting ART in order not to overlook immune-reconstitution syndrome and subsequent liver decompensation due to flares of liver enzymes.

ii See p. 50 for assessment of HBV Rx indication. Some experts strongly believe that any HBV-infected patient requiring ART should receive TDF + 3TC or FTC unless history of TDF intolerance, particularly in HIV/HBV coinfected patients with advanced liver fibrosis (F3/F4). TDF administration should be adapted to creatinine clearance if necessary. Antiretroviral naive Asian, HBe-Ag+, HIV-coinfected patients initiating ART with TDF or TDF+FTC reached unexpected high rates of HBe (and even HBs) seroconversion, strengthening the rationale for early ART.

iii If a patient is unwilling to go on early ART, adefovir and telbivudine may be used as an alternative to control HBV alone. A case report suggested possible anti-HIV activity of telbivudine. In-vitro data using an assay which was able to demonstrate anti-HIV activity of entecavir, however, failed to detect an influence of telbivudine on the replicative capacity of HIV-1. In patients with HBV genotype A, high ALT and low HBV-DNA, PegIFN might be used for a total length of 48 weeks. Recent data suggests that on-treatment quantification of HBsAg in patients with HBeAg-negative chronic hepatitis B treated with Peg-IFN may help identify those likely to be cured by this therapy and optimize treatment strategies. The optimal treatment duration for nucleos(t)ide analogues with anti-HBV activity has not yet been determined and experts recommend life-long therapy if anti-HBV nucleos(t)ides are given as part of ART. With patients not requiring ART and on treatment with telbivudine +/- adefovir, or those on ART where nucleoside backbone needs changing, anti-HBV therapy may be stopped cautiously in HBeAg+ patients who have achieved HBe-seroconversion for at least six months or after confirmed HBs-seroconversion in those who are HBeAg-. In patients with liver cirrhosis, a stop of effective anti-HBV treatment is not recommended in order to avoid liver decompensation due to flares of liver enzymes.

iv In some cases of TDF intolerance (i.e. renal disease), TDF in doses adjusted to renal clearance in combination with effective ART may be advisable. If TDF is strictly contra-indicated, entecavir + adefovir may be tried and efficacy closely monitored, or TDF in doses adjusted to renal clearance in combination with effective ART may be advisable. NRTI substitution should only be performed if feasible and appropriate from the perspective of maintaining HIV suppression. Caution is warranted to switch from a TDF-based regimen to drugs with a lower genetic barrier, e.g. FTC/3TC, in particular in lamivudine-pretreated cirrhotic patients as viral breakthrough due to archived YMDD mutations has been observed. This has also been described in individuals with previous 3TC HBV-resistance who have been switched from TDF to entecavir. The addition of entecavir to TDF in patients with low persistent HBV replication has not statistically proved to be efficient and should therefore be avoided. Results of trials are being awaited.

1. HCV treatment offers the possibility of eradicating HCV within a defined treatment period. This is potentially advantageous for the subsequent management of the patient with HIV, and every coinfected patient should therefore be considered for treatment when the benefits of therapy outweigh the risks. This also needs to be seen in the context of faster liver fibrosis progression in HIV/HCV coinfection and with better HCV treatment outcome with improved management in these patients.
2. Information on liver fibrosis staging is important for making therapeutic decisions in coinfected patients. However, a liver biopsy is not mandatory for considering treatment of chronic HCV. Current therapy is particularly recommended in patients with a high likelihood of achieving sustained virological response (SVR): genotypes 2 or 3 and patients infected with genotype 1 if the viral load is low (< 600.000 IU/mL) and/or if the IL28B-CC genotype is present [(i)].

   Based on 4 baseline variables (serum HCV-RNA, HCV genotype, liver fibrosis staging using elastometry, and IL28B genotyping), the Prometheus index has recently been developed and can optionally be used as a risk calculator for predicting the likelihood of SVR using Peg-IFN-ribavirin therapy in HIV-HCV coinfected patients. It is freely available on the web (**ideasydesarrollo.com/fundacion/prometheusindex.php**), like the Framingham score for predicting cardiovascular risk.

   Insulin resistance (which can be determined using the homeostasis model assessment of insulin resistance HOMA IR) has been reported as a negative predictor of achievement of SVR. Also vitamin-D levels may be measured and in case of vitamin-D deficiency, corrected by corresponding supplementation prior to HCV treatment initiation.
3. In case of the availability of a liver biopsy or FibroScan demonstrating lower stages of liver fibrosis (F0-F1), regardless of HCV genotype, treatment can be deferred. This may also account for patients with low fibrosis stages and low chances of SVR under the current treatment options (i.e. IL28B genotype TT) for whom improved treatment options will become available within the coming years. In these cases, fibrosis assessment should be carried out at frequent intervals to monitor for fibrosis progression.

The combination of Peg-IFN alpha and ribavirin (RBV) is the treatment of choice for HCV infection. The standard dose for Peg-IFN 2a is 180 µg once weekly, and for Peg-IFN 2b it is 1.5 µg/kg bodyweight once weekly. An initial weight-adapted dose of RBV of 1000 (wt ≤ 75 kg) -1200 (wt > 75 kg) mg/day (administered bid) is recommended for all HCV genotypes in the HIV setting. With the expected registration of the first oral direct acting antivirals (DAAs) telaprevir and boceprevir mid 2011 in the US and somewhat later in Europe, treatment recommendations for hepatitis C genotype 1 patients will change depending on the availability of the respective agents. As so far only interim data is available (12 week treatment response data) with telaprevir, no treatment recommendations for boceprevir can be made until first results from pilot trials in HIV/HCV coinfection become available. For patients with HCV genotype 1 infection, telaprevir can be added to Peg-IFN/RBV standard treatment for 12 weeks at 750 mg every 8 hours. In case of successful treatment response at week 4 (HCV-RNA < 1000 IU/mL), telaprevir should be continued until week 12. If HCV-RNA at week 12 is still < 1000 IU/mL, dual therapy with Peg-IFN/RBV should be continued until week 24. If HCV-RNA is < 20 IU/mL at week 24, dual therapy with Peg-IFN/RBV should be continued for another 24 weeks resulting in a total treatment duration of 48 weeks. Due to drug-drug interactions and limited drug-interaction studies, telaprevir can currently only be safely combined with boosted ATV or EFV (with EFV, telaprevir doses need to be increased to 1125 mg every 8 hours) in combination with TDF or ABC and FTC or 3TC. Data in combination with RAL is to be published shortly (please also check **www.hep-druginteractions.org**).

i A genetic polymorphism nearby the IL28B gene, encoding interferon-lambda-3 (IFN-lambda-3), was recently associated with an approximately two-fold change in response to peginterferon-ribavirin treatment. Because the CC genotype leading to better response is significantly more frequent in European than African populations, this genetic polymorphism also explains approximately half of the difference in response rates between African-Americans and patients of European ancestry.

4. The primary aim of anti-HCV treatment is sustained virological response defined as undetectable serum HCV-RNA 24 weeks after the end of therapy, evaluated using sensitive molecular tests.
5. If chronic hepatitis C is detected early in the course of HIV infection (before the initiation of ART is necessary), treatment for chronic HCV is advised. For patients with a CD4-count < 500/µL early ART initiation is recommended to optimize HCV treatment outcome. However, if a coinfected patient has significant immunodeficiency (CD4-count < 350 cells/µL), the CD4-count should be improved using ART prior to commencing anti-HCV treatment. Patients with a CD4 relative percentage > 25 % are more likely to achieve SVR than lower CD4 percentage.
6. If an early virological response (decline of at least 2 log10 reduction in HCV-RNA at week 12 compared to baseline) is not achieved, treatment should be stopped (see **p. 57**). Different stopping rules may apply when DAAs are being used as HCV therapy; however, it is too early to make recommendations for HIV/HCV coinfected patients. In the setting of using a HCV protease inhibitor, an increased risk for emergence of resistance will occur with persistent HCV replication and selective drug pressure by continuous drug application.
7. During Peg-IFN plus ribavirin therapy, ddI is contraindicated in patients with cirrhosis and should be avoided in patients with less severe liver disease. D4T and ZDV should also be avoided if possible. ABC can be safely used with concomitant HCV therapy if appropriate ribavirin dosages (weight adapted see point 4) are being used.
8. Identification of patients with acute hepatitis C is important since treatment in the acute phase leads to higher SVR rates than for treatment of chronic HCV infection. In patients with acute HCV infection, HCV-RNA should be measured at initial presentation and 4 weeks later. Treatment should be offered in patients without a decrease of 2 log10 of HCV-RNA at 4 weeks compared with initial HCV-RNA and to patients with persistent serum HCV-RNA 12 weeks after diagnosis of acute HCV. Duration of treatment should be based on rapid virological response (RVR) regardless of genotype (see **p. 58**). Patients who do not achieve a ≥ 2 log10 decrease in HCV-RNA level at week 12 should discontinue therapy. Unfortunately, results from randomized prospective treatment trials are not available so far to allow a more precise recommendation on treatment duration or role of ribavirin in treatment of acute hepatitis C at this point.

Diagnostic procedures for hepatitis C in HIV coinfection

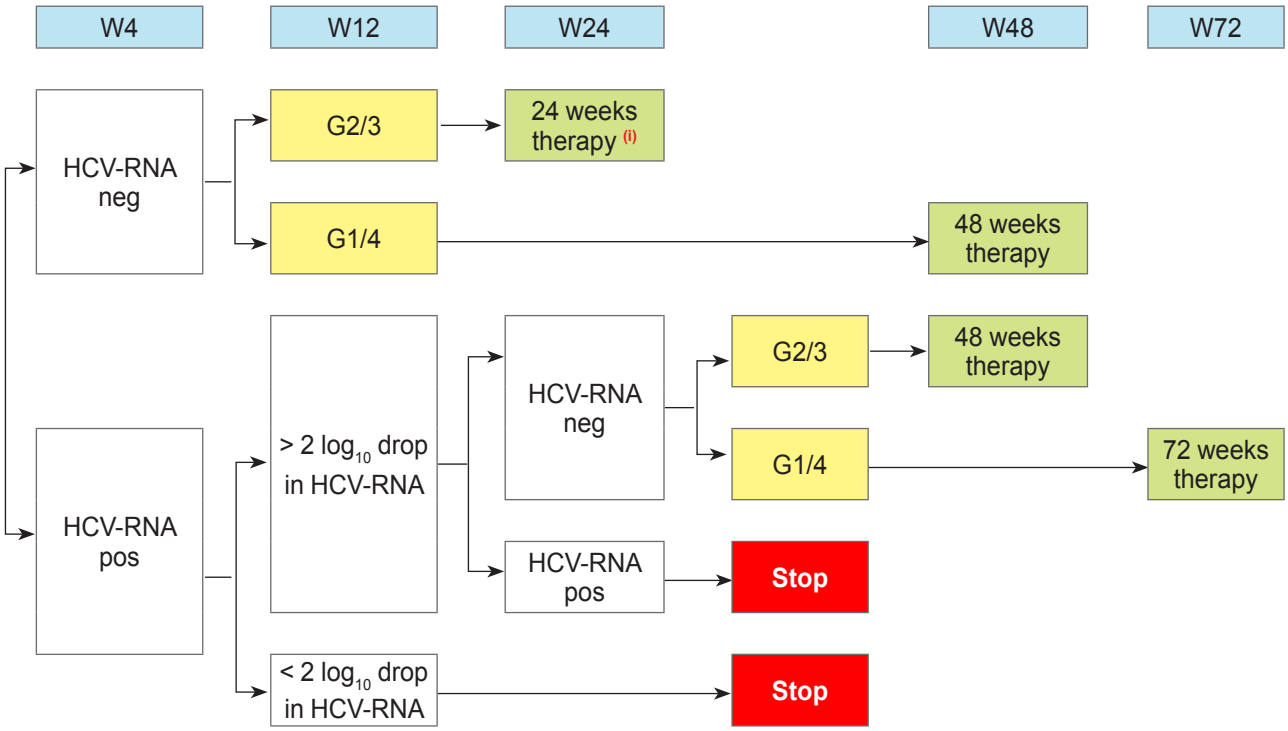
Diagnosis of hepatitis C
HCV-Ab (positive 1-5 months after infection, may rarely be lost with immunosuppression)
HCV-RNA levels [(i)] (in particular, important for the prediction of response to treatment)
Status of liver damage
Grading of fibrosis (e.g. FibroScan, liver biopsy, serum fibrosis markers [(ii)])
Hepatic synthetic function (e.g. coagulation, albumin, CHE)
See "Management of HIV-positive patients with cirrhosis" - p. 40
Before HCV treatment
HCV genotype and serum HCV-RNA
IL28B
Autoantibodies (ANA, LKM1) [(iii)]
TSH, thyroid autoantibodies
Monitoring of HCV treatment
Differential blood count and liver enzymes every 2-4 weeks
HCV-RNA at week 4 (to evaluate rapid virological response), and weeks 12, 24 and 48 (72 if applicable) and 24 weeks after stopping HCV therapy
CD4-count every 12 weeks
TSH every 12 weeks

i Low viral load defined as less than 400,000 - 500,000 IU/mL when using PegINF+RBV. There is no standard conversion formula for converting the amount of HCV-RNA reported in copies/mL to the amount reported in IU/mL. The conversion factor ranges from about one to five HCV-RNA copies per IU/mL.

ii Serum fibrosis markers include APRI, FIB-4, Hyaluronic acid, Fibrometer, Fibrotest, Forns, Hepascore and other indices; recently more complex tests such as Fibrometer, Fibrotest and Hepascore have shown to more accurately predict liver fibrosis than simple biochemical tests such as APRI, FIB-4 or Forns.

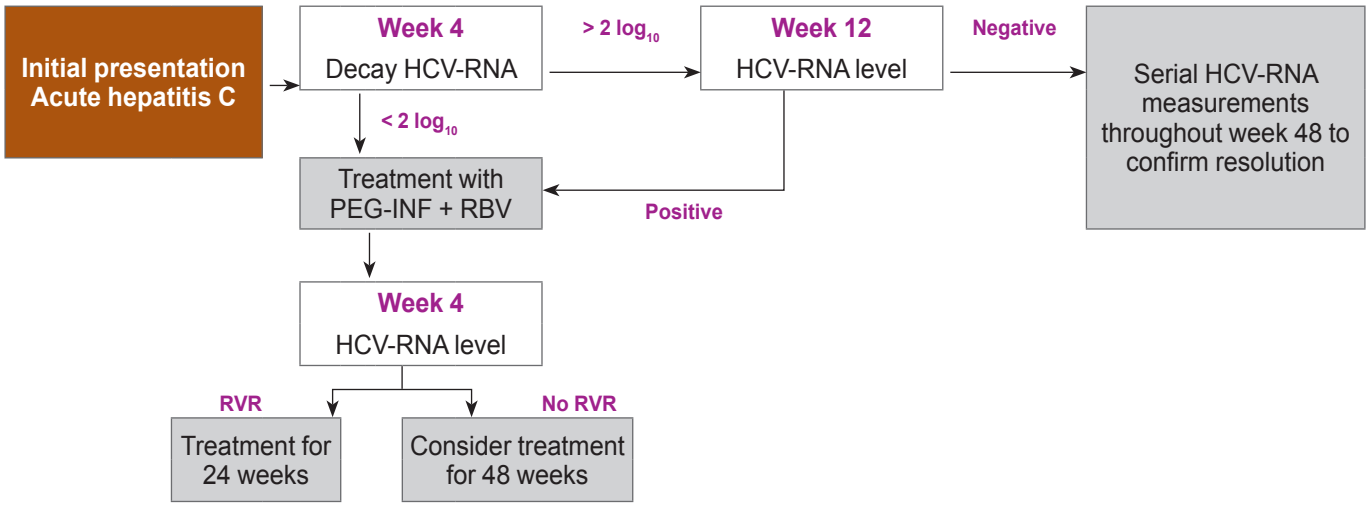
iii Patients with positive anti LKM or ANA with homogeneous pattern should be evaluated for concurrent autoimmune hepatitis, especially in the presence of ALT elevation during treatment.

Proposed optimal duration of HCV therapy in HCV/HIV coinfected patients



i In patients with baseline low viral load (< 600 000 IU/mL) and minimal liver fibrosis.

Algorithm for management of acute HCV in HIV-infected individuals



Definitions of treatment response on PegIFN and ribavirin

	Time	HCV RNA
Rapid Virological Response (RVR)	Week 4 on treatment	Undetectable (< 50 IU/mL)
Early Virological Response (EVR)	Week 12 on treatment	Undetectable (< 50 IU/mL)
Delayed Virological Response (DVR)	Week 12 on treatment	> 2 log10 decrease from baseline but not undetectable
Null Response (NR)	Week 12 on treatment	< 2 log10 decrease from baseline
Partial Non-Response (PR)	Week 12 and week 24 on treatment	> 2 log10 decrease at week 12 but detectable at week 12 and 24
Sustained Virological Response (SVR)	24 weeks post-treatment	Undetectable (< 50 IU/mL)
Breakthrough	Any time during treatment	Reappearance of HCV RNA at any time during treatment after virological response
Relapse (RR)	End of treatment and week 24 post-treatment	Undetectable HCV RNA at end of therapy, detectable by week 24 post-therapy

Adapted from EASL HCV CPG 2011 (**www.easl.eu/assets/application/files/d0df9f948c85a72_file.pdf** - accessed 07/05/2011)

Classification of and interventions for HCV/HIV-coinfected non-responders/ relapsers to prior interferon-based therapies

CATEGORY	SUBGROUP	SUGGESTED INTERVENTION
Suboptimal treatment	• Suboptimal schedule • Interferon (monotherapy or with ribavirin) • Low ribavirin dose • Short length of therapy	Re-treatment using combination therapy with Peg-INF plus weight-based ribavirin dosing
	Limiting toxicities & poor adherence	Optimal support (SSRI, paracetamol/ NSAID, adherence support, use of haematopoietic growth factors [i])
Optimal treatment with virological failure	Relapse	Re-treatment using combination therapy with Peg-INF plus weight-based ribavirin dosing (consider longer treatment duration)
	Non response (no HCV-RNA negativization during treatment)	Wait until new antivirals become available through clinical trials or are licensed

i Data on the use of haematopoietic growth factors in HIV/HCV coinfection so far is limited to an improvement in quality of life but not antiviral efficacy; treatment with growth factors is currently mostly off-label in Europe.

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English version